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A Plan for the Management of Historic Mines in Montana: Placer & Hardrock

Compiled By

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A Plan called for by the Programmatic Agreement Among the USDA Forest Service, the Bureau of Land Management, the Montana State Historic Preservation Officer, and the Advisory Council on Historic Preservation regarding the Management of historic placer and lode mining properties in Montana.

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I

INTRODUCTION

This overview focuses on the development and progress of hard rock & placer mining operations across Montana. The document consists of a comprehensive review of hard-rock & placer mines using unpublished records from our Cultural Resource Annotated Bibliography System (CRABS) files which were all gleaned in our effort to produce an in-depth and comprehensive overview of the historic mining activity in Montana. Mary Horstman of the United States Forest Service wrote the larger mining context in Chapter 2, and the chronology that follows is from Searching For The Mother Load, by Zane L. Fulbright. The Bureau of Land Management was responsible for providing a large portion of the finical backing which was essential.

The goals of the project were twofold. First, we were tasked with generating a wide-ranging historic context document as a basis for evaluating the potential National Register eligibility of mine properties in Montana. We chose to approach this historic overview on a regional base. We used the eight regions of the State that Carroll Van West developed back in 1985. Region One consists of the counties of Blaine, Phillips, Valley, Daniels, Roosevelt, and Sheridan. This region had only a few mines mainly in Phillips County. Region Two consists of Garfield, Treasure, Rosebud, McCone, Prairie, Custer, Powder River, Richland, Dawson, Wibaux, Fallon, and Carter Counties and had no mines so you will not find a section on Region Two. Region Three consists of Glacier, Pondera, Teton, Toole, Cascade, Liberty, Chouteau, and Hill Counties. This region had mines in Cascade and a few in Liberty County around the Sweetgrass Hills. Region Four has Meagher, Judith Basin, Wheatland, Fergus, Golden Valley, Petroleum, and Musselshell counties. The mines in this region were mostly in the north west portion. Region Five includes Park, Sweetgrass, Stillwater, Carbon, Yellowstone, and Big Horn Counties. Park County had most of the mines in this region. The Sixth Region is in the far west and consists of Lincoln, Sanders, Mineral, Flathead, Lake, Missoula, and Ravalli Counties. Most of the mines here were located in Lincoln and Mineral Counties. Region Seven was by far the heaviest mining area and consists of Lewis & Clark, Powell, Granite, Deer Lodge, Silver Bow, Jefferson, and Broadwater. Mines were found all over this area and it is still an active mining area. The last region is Region Eight and is made up of the counties of Beaverhead, Madison, and Gallatin. This region was the location of the first real mining boom in Montana. The second part of the project is to lay out suggested management procedures.

This report consists of 5 chapters, including this introductory chapter. Chapter 2 consists of a chronology of mining in Montana and presents a broad overview of the advent and character of mining operations in the eighteenth, nineteenth, and early twentieth century. This chapter establishes the overall character of mining operations over a 300-year period, although a later chapter focuses on mining in the nineteenth and twentieth centuries in Montana.

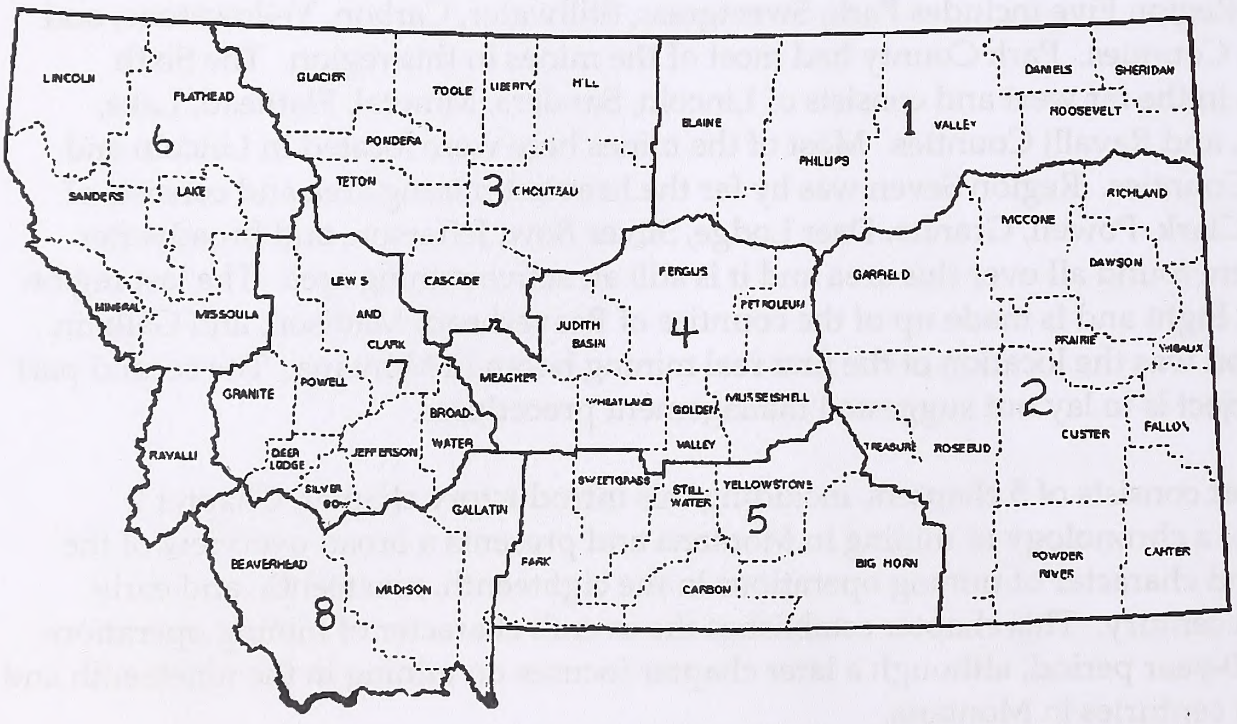
It is sometimes difficult, even today, to recognize that Montana's extractive industries were subject to many perturbations resulting from larger regional, national and international factors. Despite its geographic isolation, this was true to some degree even in the twentieth century.

Chapter 3 constitutes the bulk of the historic context portion of this document. It consists of region by region narratives of mining developments synthesized from various summaries in the CRABS. It is all presented in the Multiple Property Listing format, and may be expanded in the future.

Since the goal of this document is provide, ultimately, some basis for managing this class of cultural resources, Chapter 4 summarizes property types, and deals with the Mining Domains as well.

Chapter 5 is the last chapter and provides recommendations regarding the management of Montana's mines to promote their role in the state's cultural heritage. To anticipate more detailed discussions, mines classified as past producers appear to embody higher degrees of integrity and eligibility as required under NRHP criteria and are recommended for more aggressive management compared to other types of mining properties in the state.

In the Appendix we placed a table which lays out all the districts in Montana and indicated the County and Region/s which they are located in. This table is followed by a table that cross-reference other names that the districts a known by with the recognized name. The Glossary and Bibliography close it out.



Regions on which the context in Chapter 3 are organized.

II

HISTORICAL OVERVIEW

MINING IN NORTH AMERICA

For thousands of years prior to the arrival of Europeans, Native American tribes practiced mining throughout North America. They extracted a wide variety of both metallic and non-metallic materials from the earth and traded them widely. In addition to obsidian, quartzite, basalt, and chalcedony which were used in fashioning weapons and tools, salt, mineral pigments, decorative and building stone, and coal as well as iron, copper, gold and silver were exploited, for both utilitarian and decorative purposes. These materials were either excavated from exposed deposits in cliffs or caves, or from shallow surface pits, or collected from mineral springs, bogs, tidal marshes, etc. Many of these materials circulated widely from their points of origin across the continent through well-established trade patterns.

When Spanish explorers arrived in the New World during the late 15th and 16th centuries, they found vast quantities of silver and gold among the inhabitants of South and Central America and Mexico. Much of the Spanish exploration of the American Southwest during the 16th and 17th centuries was fueled by rumors of still greater wealth abounding in the North American interior. Far to the north and east, French and English colonists along the Atlantic seaboard also hoped to discover precious metals on the North American continent. However, most of the mineral wealth of those colonies lay in more utilitarian substances--salt, lead, coal, iron, copper and saltpeter. In the British colonies, the development of deposits and production of both raw and refined materials was heavily taxed and regulated by the British crown determined to control these resources for the Good of the Empire.

The American Revolution ended imperial restrictions and royalties on colonial mineral development east of the Mississippi River. Entrepreneurs were free to search for, locate and develop mineral resources throughout the new nation. Gold was found in Georgia and the Carolinas, copper in the Great Lakes region of the Northwest Territory, and lead along the Mississippi. When Thomas Jefferson sent Lewis and Clark westward to explore the Louisiana Purchase in 1804, he included in their instructions the directive to observe and record "The mineral productions of every kind, but more particularly metals, limestone, pit-coal, saltpeter; salines and mineral waters, noting the temperature of the last, and such circumstances as may indicate their character...." (Bernard DeVoto, ea. The Journals of Lewis and Clark, pp.***) The explorers did so, collecting mineral samples and noting the presence of saltpeter caves and lead deposits on the Gasconade River, as well as salt licks and mineral springs they encountered en route to the Pacific. Although their journals reported the presence of valuable and useful minerals, there

was nothing to suggest the presence of vast deposits of precious metals. (Paul R. Cutright, Lewis Clark: Pioneering Naturalists, 1969, pp. 56-57)

Over the next four decades, most mineral development within Louisiana Purchase lands took place along the lower Missouri, particularly in the present-day state of Missouri where lead and saltpeter were produced. It was not until the mid-nineteenth century that three hundred years of expectations concerning the mineral wealth of the American West materialized-- in an unprecedented wave of mine discovery and development.

MINING IN THE AMERICAN WEST

Although explorers and fur traders returned from travels in the West with reports of placer gold in the streams and mineralized quartz outcrops, mineral development in the region did not begin until 1849, with the discovery of gold in California. Between 1849 and the mid-1850s, thousands of prospectors from around the globe poured into California searching for quick riches in the form of placer gold. It was the West's first and greatest mining stampede. For such men, mining was merely a matter of "hand shoveling", that is, the excavation of gold-bearing surface deposits by pick and shovel. By the mid1850s, most of California's readily worked placer deposits had been appropriated or exhausted. Much of the remaining gold was locked in hard rock ore deposits known as lodes, beyond the reach of the pick-and-shovel miner. In a sequence that would repeat itself throughout the West over the next half-century, those who failed to strike it rich in one place would move to another in search of more promising diggings. Hard rock deposits and placers requiring more than hand methods were left to await capital investment, the arrival of railroads and installation of heavy equipment for the development of large-scale mining and reduction. Meanwhile, gold seekers pushed the mining frontier toward the interior of the continent, moving from California into the Great Basin and Rocky Mountains, along the Columbia River Basin, onto the head waters of the Platte River in Colorado and Wyoming, and into the desert highlands of the Southwest. By the late 1850s, mining stampedes were underway in Colorado, Nevada, Eastern Washington and British Columbia. Prospectors drawn northward by an 1857 gold strike on British Columbia's Fraser River subsequently made discoveries on the Clearwater, Salmon and Snake Rivers in Idaho in 1860- 1863. It was largely prospectors from these Idaho camps who made the major gold discoveries that established mining in Montana in the early 1860s.

EARLY PLACERING AND THE GOLD RUSH ERA, 1858-1870

The first recorded discovery of gold in Montana occurred in 1858 on Gold Creek, a small tributary of the Upper Clark Fork about 20 miles northwest of present-day Deer Lodge. The brothers James and Granville Stuart and their friend Reece Anderson had come to Montana from California in the mid 1850s. While traveling though Utah they

were diverted by an armed conflict and ended up near the Deerlodge valley and prospected the stream. Gold Creek was never a rich district in comparison to other Western mining camps, but by 1861-1862 its diggings were promising enough to attract an increasing number of prospectors to the area. Most came from the Idaho Gold fields but considerable numbers also were drawn from the declining fortunes of gold camps in California, Nevada and Colorado. (Granville Stuart, Prospecting for Gold: From Dogtown to Virginia City, 1852-1864, 1925, pp. 133-140, 161, 205-272; Michael P. Malone, Richard B. Roeder, William L. Lang, Montana: A History of Two Centuries, revised edition 1991, pp. 64-67)

Attracted by word of the Gold Creek mines and by fresh discoveries in Idaho, gold hunters flooded into southwestern Montana in search of new ground. Between 1862 and 1864, prospectors unearthed enormous placer deposits at Grasshopper Creek (Bannack), Alder Gulch (Virginia City), Last Chance Gulch (Helena) and Confederate Gulch. These major strikes attracted thousands of people and yielded millions of dollars in gold over the next few years. The population influx to these camps was so substantial that only one year after creating the Idaho Territory in 1863 (encompassing all of present-day Idaho, Montana and most of Wyoming), Congress created the Montana Territory. Besides these boomtowns, dozens of less spectacular placer camps grew up and flourished through west central Montana during the mid- to late 1860s, covering an area from the Upper Yellowstone to the Idaho border and north to the Kootenai River country. The last of the territory's major gold rushes occurred on the western edge of Montana's mining region at Cedar Creek (near present-day Superior) in the winter of 1869-1870. However, placer discoveries and small stampedes continued to occur through the 1870s and 1880s, as mining spread eastward into central and north-central Montana and into the more remote northwestern area of the Territory. (Malone, Roeder & Lang 1991, pp. 92-96; Timothy F. Light & Mary C. Horstman, Inventory and Evaluation: Cedar-Quartz Historic Mining District 1996, pp. 6-8; Rossiter W. Raymond. Statistics *of* Mines and Mining in the States and territories West of the Rocky Mountains 1869- 1871; Muriel Sibell Wolle, Montana Paydirt: A Guide to the Mining Camps of the Treasure State 1963. Engineering & Minins Journal, New York, 1 866-1 870; New Northwest, Deer Lodge, 1 868-1 870.)

TRANSPORTATION

During the initial years of the placer boom era, Montana's transportation system consisted largely of the trail network laid down by tribal inhabitants over the previous 8,000 to 10,000 years. Although some trails had been cleared and improved by trappers and traders during the first half of the 19th century, for the most part the ancient travel routes had remained little changed until the early 1860s. As miners stampeded into the region, old trails widened into roads and new trails were blazed to remote diggings. During the late 1850s, Army Captain John Mullan had proposed and surveyed a wagon road route to connect navigable waters on the Columbia River with those of the

Missouri River. The Mullan Road, as it came to be known, was completed in 1862, just in time to play an important role in Montana's gold rush era. Between the steamboat ports of Walla Walla on the Columbia and Ft. Benton on the Missouri, this rugged road led miners into the heart of Montana's mining country. Another important road was the Corinne-Virginia City Road, providing freight and travel access between Montana's mining camps and Utah's Mormon communities and later linking the gold fields to the Union Pacific Railroad. The Bozeman Trail, pioneered in 1863 by John Bozeman, provided a shortcut from the Oregon Trail at Ft. Laramie in Wyoming to the Gallatin Valley near present-day Bozeman. Travelers coming into Montana from the upper Midwest during the 1860s used still another overland route, the Minnesota-Montana Road. Crossing the plains of Northern Dakota and Montana, it connected to the Mullan Road at Fort Benton. (Malone, Roeder & Lang 1991, pp. 65, 72-78; Oscar O. Winther, "Early Commercial Importance of the Mullan Road," Oregon Historical Quarterly 46, March 1945; Winther, The Transportation Frontier: Trans-Mississippi West. 1865-1885, 1964; Ray Allen Billington, Westward Expansion

Although many followed well-traveled trails, most early roads and trails leading from main travel routes to remote mining camps were extremely primitive affairs. In some places, local entrepreneurs capitalized on the situation by building toll or subscription roads. Privately operated ferries and bridges were common at river crossings. Although undertaken voluntarily in some early mining districts, most public road improvements occurred after the organization of Montana's territorial and county governments (c.1864-1865). Hand-in-hand with the expansion and improvement of roads came the establishment of freight companies, stage lines, and businesses catering to travelers. (Light & Horstman 1996, 14-15, 18-19; New Northwest 1868-1870; Malone, Roeder, &Lang 1991, pp. 77-78)

Among the property types associated with transportation during the early gold rush era in Montana are trails, roads, way stations or roadhouses, corrals, bridge sites, and ferry landings.

MINING CAMPS AND THEIR POPULATION

The term "camp" is used to describe the settlements that grew up around placer diggings. It conveys the intensely temporary nature of these communities. During the earliest stages of a mining stampede, miners lived in tents, dugouts, and hastily assembled lean-tos of rough cut timber. If the diggings paid well enough to sustain a community for more than a season, more substantial structures of log and rock appeared, perhaps followed by frame buildings of hand sawn or rough milled lumber. Placer camps rarely, if ever, were laid out on a planned town site. Nearly all grew up haphazardly as miners located claims along streams and gravel deposits and situated cabins and other structures wherever ground was available. Streets were mostly unimproved, laid out wherever topography and necessity dictated. If placer mining

gave way to more long-term economic activity, such as agriculture or development of substantial hard rock deposits, a mining camp might take on the forms of a more stable community in improved streets and structures of brick and masonry. However, even when this greater permanence and stability was achieved, such towns continued to be known as "mining camps". (Malone, Roeder & Lang 1991, pp. 82-91; Duane A. Smith, Rocky Mountain Mining Camps: The Urban Frontier 1967; Wolle 1963); Richard V. Francaviglia, Hard Places: Reading the Landscape of America's Historic Mining Districts 1991, pp. *****;

The people who populated these early mining camps during the 1860s represented a broad cross-section of occupations, geographic origins, and ethnic backgrounds. Not all-gold hunters were miners. Anyone who stood to make money from miners swarmed into the camps. Almost overnight camps could boast saloons, restaurants, dance halls, bordellos, and hotels, mercantile, laundries and livery stables. Many prospectors brought other skills to the diggings and often found they could make as much or more from working as a blacksmith, carpenter, butcher, baker, brewer, or other trade as they could from mining. As camps showed signs of surviving the initial stampede phase, other businesses such as stage and freighting companies, sawmills, and banks took hold. Doctors, lawyers, photographers, and others moved into the camp. Although the mining frontier was largely a male domain, women put in an early appearance in the camps. While many were associated with saloons, dance halls, and other entertainment, others ran restaurants, boarding houses, and laundries, either on their own or with family members. (Smith 1967; Malone, Roeder & Lang 1991, pp. 82-91; Elliott West, The Saloon on the Rocky Mountain Mining Frontier 1979; Paula Petrick, No step Backward: Women and Family on the Rocky Mountain Mining Frontier, Helena Montana 1865-1900, 1987.)

Ethnic backgrounds were diverse in the Montana mining camps, as they were throughout the West. Of the ethnic groups, the Irish were by far the most numerous, although there were also large numbers of French-Canadians in some Montana camps. Chinese miners appeared in the Montana diggings as early as 1865, and by the 1870s were probably the second largest of the ethnic groups. This ethnic diversity was often reflected in place names in mining districts. More than one Montana camp had a China, Swede, German, or Ireland Gulch, or a "Nigger Hill". [NEED CENSUS INFO RE: ORIGINS, PERCENTAGES, ETC. HERE] Some of the place names indicated the origin of a district's discoverers or early inhabitants. Gulches named for states abound, such as Oregon, Ohio, California, New York, etc. Not surprising for gold camps established during the Civil War, many names also conveyed political sentiments: Confederate Gulch, Union Gulch, and Yankee Gulch. Still others reflected experiences, characteristics, or activities associated with a particular place: Beefstraight Gulch (named for a winter when the inhabitants survived on "beef straight, no flour", Snowshoe Gulch, Avalanche Creek, Slaughterhouse Gulch (where the camp's cattle were butchered), Mill Creek, etc. (Smith 1967; Malone, Roeder & Lang 1991, pp. 8291;

Randall E. Rohe, "After the Gold Rush: Chinese Mining in the Far West, 1850-1890" in Montana: The Magazine of Western History, Autumn 1982, pp. 2-19; Raymond 1869-1 X77; Light & Horstman 1996,pp. 12-14)

Many of the individuals who came to Montana as prospectors during the gold rush era remained to figure prominently in territorial and early state affairs. Among them were W.A. Clark, S.T. Hauser, Granville and James Stuart, Conrad Kohrs, Anton Holter, and A.J. Davis. Clark came to Montana as a prospector and freighter. He expanded his activities into banking and (frequently through foreclosure) acquired numerous mining claims in Butte on which he ultimately built a copper empire. Hauser and Kohrs were partners in the early days of Alder Gulch. A butcher by training, Kohrs found he could make more money supplying meat to the miners than he could by mining. Eventually he parleyed his butchering business into an open range cattle empire, while continuing to invest in mining. Anton M. Holter arrived in Virginia City in November 1863 with sawmill equipment, and engaged in the lumbering business both there and in Helena during the 1860s eventually expanding his business to become one of the leaders in the lumber industry in the Pacific Northwest. He also invested in the first hydroelectric development in Montana, constructing a dam across the Missouri near Helena that bears his name. A.J. Davis was another of the early prospectors in the Territory. He went on to become one of Butte's first industrial mining entrepreneurs. Like Clark, Davis also expanded into banking and other interests. In partnership with S.T. Hauser and Granville Stuart, the Davis-Hauser-Stuart ranch was among the largest outfits in Montana's early range cattle industry. (Michael A. Leeson, ea. History of Montana: 1739-1885, 1885; Joaquin Miller, comp., An Illustrated History of the State of Montana 1894; Tom Stout, ea., Montana, Its Story and Biography, 1921.

Property types associated with boom-era mining camps of the 1860s include town sites, cabins, tent platforms, foundations, dugouts, brick or masonry buildings, log buildings, frame buildings, corrals, stock slaughter sites (boneyards), outhouses, and domestic dumps. While sawmills were rare in the earliest days of these camps, hand-sawing operations or small sawmills eventually operated in nearly all-mining districts. Sawpits, sawmill sites and associated sawdust deposits may be found near mining camps.

MINING METHODS

The mining methods employed in Montana's gold fields during the 1860s were typical of those used throughout the mining region of the West. The extraction of heavy minerals such as gold from gravel, sand or other eroded material by concentration in running water is known as placer mining. In its simplest form, placering is accomplished by hand labor and commonplace tools were a pan, a pick, and a shovel. It was largely this apparent simplicity of method that made placer mining for gold attractive to those seeking quick wealth. However, even the most basic placer method,

known as hand shoveling could involve a variety of washing processes. In addition to gold panning, which was frequently used as a sampling technique, miners might employ rockers, long toms, sluices or dry-washers. This last method, involving the extraction of mineral from gravels by repeated shaking and screening without the use of water was seldom used in Montana. Because water was relatively plentiful, Montana miners relied on rockers, long toms, and sluices. As its name implies the rocker was a rocking box in which gravel and water were mixed and agitated, washing through screens and causing gold to lodge in riffles at the bottom of the box. The long tom was an inclined trough with a screen at the lower end. A steady stream of running water washed gravel shoveled into the tom. Both rockers and toms were frequently used in conjunction with sluices. A sluice might be either a ditch or trough-like wooden sluicebox, its bottom lines with riffles (transverse bars, wooden cleats or other irregular surfaces). Gold-bearing material shoveled into the sluice was carried over the riffles by a current of water, with the heavier gold settling into the riffles. Riffles were frequently "charged" with mercury to improve the capture of gold. The initial exploration and development of placer deposits in Montana involved the use of these basic placer techniques. However as the easily worked surface gravels played out, miners resorted to more advanced methods of excavation and washing.

Ground-sluicing was increasingly popular in the mid- and late 1860s It involved the use of ditches and/or flumes to direct the flow of water directly over or against a gravel deposit, using the current to excavate the placer material and carry it into riffled sluices, where the gold was recovered. Dams and reservoirs were constructed to provide a more reliable water supply and greater force for ground sluicing. Such construction projects involved a considerably greater commitment of time, money, and labor than most individual miners could undertake. As a result, miners who engaged in ground sluicing usually combined in companies to share both costs and labor. Although this method occurred where placer deposits were substantial enough to warrant the investment of money, materials, and effort, it was by no means limited to major mining areas. (E.D. Gardner and C.H. Johnson, Placer Mining in the Western United States. Part I: General information, Hand-Shoveling and Ground-Sluicing, September 1934; International Library of Technology, Placer Mining! Surface Arrangements at Ore Mines. Preliminary Operations. Ore Mining. Supporting Excavations. Assaying 1924; Raymond 1869-1877; Eugene B. Wilson, Hydraulic and Placer Mining, 1918; Otis E. Young, Western Mining: An Informal Account of Precious-Metals Prospecting. Placering. Lode Mining and Milling on the American Frontier from Spanish Times to 1893, 1970; Paul W. Thrush, Ed. A Dictionary of Mining. Mineral and Related Terms. 1968.)

Where ground sluicing was impractical due to gravel depth cemented deposits, lack of access to available water or due simply to the expense and labor required for ditch and flume construction, miners frequently employed a method known as drifting. Drift mining is similar to hard rock mining in the respect that a tunnel or shaft is sunk into

the mineral deposit. However, in drifting, the excavated material is hoisted to the surface and washed like other gravels. In some drift mines, explosives were used to break up the deposit, rendering it workable by the usual placer methods. (Gardner & Johnson, Placer Mining . . . . Part I, September 1934, p. 47; Thrush 1968, p.515.)

Hydraulic mining was a more aggressive form of placering. It required higher volumes of water and the construction of darns and reservoirs. The method employed gravity or "fall" to force water through canvas hoses or pipe and out of nozzles (known as giants or monitors) at extremely high pressure. Hydraulics had enormous destructive power and were ideally suited to work deposits burdened with large boulders--deposits that were beyond the capabilities of the pick-and-shovel miner. As the water jet excavated a gold-bearing bank, the gravels were carried in the bywash (or swept by another monitor) into sluices where the gold was recovered. Developed in California in the 1850s, hydraulic mining first appeared in Montana at Bannack in 1865. By the late 1860s, it was practiced in most of the territory's major placer districts but was not yet common in smaller or more remote areas. Because hydraulic mining required major investments to purchase and transport the heavy equipment, acquire additional water rights and construct extensive ditches, reservoirs and dams, the technology was not widely used in Montana until transportation systems improved and sufficient capital was available for developments which occurred during the 1870s. (Gardner & Johnson, Placer Mining in the Western United States. Part II: Hydraulicking. Treatment of Placer Concentrates and Marketing of Gold. October 1934; International Library of Technology, 1924; Randall E. Rohe, "Hydraulicking in the American West: The Development and Diffusion of a Mining Technique" in Montana: The Magazine of Western History, Spring 1985, pp. 18-33; Wilson 1918; Young, 1970)

Properly types associated with the mining methods of the 1860s placer boom era include rockers, toms, sluiceboxes, flumes; placer "tailings" (boulder, cobble, and gravel piles or sediment deposits); derricks drifts and edits; ditches, reservoirs and dams; and isolated miners' cabins.

Ends without discussion on lode mining

MONTANA MINING CHRONOLOGY

1799	North Carolina gold strike
1804-06	Lewis & Clark Expedition
1807	Trappers led by Manuel Lisa of St. Louis build Fort Remon near the mouth of the Bighorn
	River; first permanent structure in Montana built by white men
	Congress passes legislation authorizing the leasing of lead mines
1808	John Colter's "Run" from Piegan warriors, near Madison River of the Three Forks of the
	Missouri River
1815	Miner's safety lamp invented

1824	Portland Cement developed
1828	William MacKenzie of Astor's American Fur Company builds Fort Union at the confluence of the Missouri and Yellowstone Rivers
1829	Georgia gold strike
1837	Smallpox introduced to Blackfoot Confederacy at Fort McKenzie on the Marias River in Loma area; 60 - 70% of Blackfoot population wiped out
1846-47	Congress passes legislation authorizing the sale of mineral lands
1847	Fort Benton established
1848	James Marshall discovers gold at Sutter's Mill, California
1852	Fur trapper Francois Finlay (Benetsee) finds gold on Gold Creek near Drummond and Garrison
1853	Hydraulic mining first tried, Nevada City, California
1855	Gold discovered in northeastern Washington Hellgate Treaty establishes Flathead Indian Reservation for Flathead, Pend d'Oreille, Kootenai, and Kalispell Indians
1856	Converter process for making steel introduced
1858	James and Granville Stuart and Reece Anderson discover gold at Gold Creek Eli Blake invents ore-crushing machine
1859	First oil well drilled, Pennsylvania Gold rush, Colorado
1860s	Gold placers discovered at Butte Gold rush, Idaho
1861-65	U.S. Civil War
1862	Homestead Act Mullan Road completed, connecting Fort Walla Walla on the Columbia River with Fort Benton on the Missouri River Bannack gold rush
1863	Alder Gulch (Virginia City) gold rush John Bozeman and John Jacobs blaze Bozeman Trail
1864	Northern Pacific Railroad granted charter Montana Territory established Last Chance Gulch (Helena) gold rush Gold discovered at Confederate Gulch (Diamond City)
1865	Gold discovered in Yogo Gulch; prospectors driven out by hostile Indians First sapphires discovered in Montana, Missouri River First oil pipeline, Pennsylvania Discovery of copper near Elizabeth Scott's stage station; Copperopolis Developed National Mining Act (Lode Mining Law) passed Alfred Nobel invents dynamite
1867	Fort Howie established to help defend Copperopolis miners from warring Piegans and Blackfeet

	Gold discovered in Wyoming
	O. H. Kelly and associates found National Grange of the Patrons of Husbandry, instrumental in regulating railroad rates in the 1870s
1869	Camp Baker established to defend Confederate Gulch miners from Indian raids
1870s	T. C. Power and Brother operate trading post near confluence of Judith and Missouri Rivers
	Silver mining begins at Butte
1870	Charles Burleigh invents compressed air drill, capable of striking 300 blows/minute
	National Mining Act amended to include Placer Act
1871	A. M. Holter, one of Montana's leading entrepreneurs, introduces ore concentrators to Montana, revolutionizing quartz mining in the territory
1872	General Mining Law passed
	First homestead patent in Montana issued
	President Grant establishes Yellowstone National Park
1873	National financial panic
1875	Creation of American Forestry Association
1876	John K. Castner opens first lignite coal mine along Belt Creek
	Battle of the Little Big Horn
1877	Desert Land Act
	Nez Perce flight to Canada
1879	H. W. Millard builds first coke ovens in vicinity of Belt
	Fort Logan established
	Rumors of placer gold at Yogo Creek; 1200-1500 people arrive
	Rush at Dry and Running Wolf Creeks; silver, lead, zinc, and gold
	Patrick H. Hughes and "Buck" Barker discover silver lode deposits on Galena Creek
1880s	Utah and Northern Railroad connects Butte to Union Pacific Railroad in Utah; first railroad in Montana
1880-81	Marcus Daly founds Anaconda Copper Mining Company (ACM)
1880	Wright & Edwards mine of "P" Mining Company located; owned by U.S. Senator T. C. Power and others
	Judith Mountains gold rush
	Charlie Russell arrives in the Judith Basin
1881	Neihart, O'Brien, and Richardson discover gold at Neihart; locate Queen of the Hills mine:
	Montana Mining District established
	George Clendenin builds Clendenin smelter in Barker
	Fire at the Barker mining district
	P. W. Gates invents cone ore crusher
1882	Great Falls founded by Paris Gibson with J. J. Hill and others
	H. H. Barnes makes first mineral discovery in Castle Mountains

	Chinese Exclusion Act halts emigration from China to U.S.
	Col. George Clendenin killed in mining accident in Wright & Edwards mine, Barker district
	Wagon road constructed connecting Neihart with White Sulphur Springs
	Reverend W. W. Van Orsdel (Brother Van), Superintendent of North Montana Mission of M. E. Church, held Neihart's first religious service at Joseph Hannah's log cabin
	T. C. Power persuaded to build stage line between Fort Benton and Billings
	Fort Benton abandoned as military post
	Western Federation of Miners established in Coeur d'Alene
1883	Northern Pacific completes transcontinental line; golden spike ceremony at Gold Creek, Montana
	Clendenin smelter closes 18 months after opening
	Yogo Town deserted
	Galt mine first mine in Montana Mining District (Neihart) developed by outside capital
	National economic recession
1884	Gold rush to Little Rockies
	Barker begins decline
	Neihart mines begin shipping ore to Omaha smelter
	William Woolsey receives mail service contract between White Sulphur Springs and Barker, via Nelhart; first regular mail service to mining camps
	Bison hunting essentially ends Northern Cheyenne Indian Reservation created
1885	Blue gems in Yogo sluice box screens identified as sapphires
1886	Hensley brothers locate the Cumberland mine in Castle Mountains
	Montana Central, branch line of Great Northern Railroad, organized
1886-87	Harsh winter depicted in Charlie Russell's "Waiting for a Chinook"
1887	Cascade County organized
	Lead smelter constructed at East Helena
	First mining claims filed at Johannesburg (near Neihart)
	First smelter constructed in Castle Mining District, treating ore from the Yellowstone mine
	J. J. Hill completes construction of the Great Northern Railroad across Montana's high line, built without government grants or subsidies
	Dawes Act opens Indian reservations to white settlement
	Montana Central connects Helena and Great Falls
1888	Silver smelter completed in Great Falls
	Great Falls incorporated
	Present-day Fort Belknap Indian Reservation created
1889	King, Czar, Emperor, Rex, and Sultan mining claims located at future site of Monarch

Fire at the Barker mining district
Montana statehood
Silver price $.935/ounce
New Zealand miners experiment with cyanidation for gold recovery

C.1890 Wet stamp process introduced to stamp milling

1890 Montana Central Railroad connects Great Falls and Monarch; Monarch established
Sherman Silver Purchase Act; silver price $1.21/ounce
Belt Mountain Miner's Union organizes
J. C. Leyner invents water-flushed drill, reducing silica dust hazard

1891 Montana Central Railroad connects Barker and Neihart with Monarch; 7 year old Mabel
Brennan hammers silver spike at Neihart; spike cast from Queen of the Hills ore
Cumberland Mine (Castle District) largest single producer of argentiferous lead in Montana
Norwegian community at Lennep establishes Lutheran congregation, second oldest in the state
Passage of the Forest Reserve Act
Cyanidation introduced in United States

1892 Castle mines producing lead, silver, and zinc; support three local smelters at their peak
Neihart begins boycotting the Chinese
Proposed railroad from Neihart to Castle abandoned due to engineering difficulties
Marcus Daly closes his Butte mines and Anaconda copper smelter in protest against high freight rates charged by Union Pacific Railroad; incorporates Butte, Anaconda & Pacific Railroad

1893 Colombian Exposition, Chicago World's Fair, opens; Eureka mine at Running Wolf receives a medal from the World's Fair for porphyry ore
Worldwide economic depression; Sherman Silver Purchase Act of 1890 repealed; silver price $.62/ounce
Great Northern Railroad completed
Henry Ford builds his first car
Frederick Jackson Turner declares the frontier closed

1894 Rumors of placer gold at Yogo Greek
Helena becomes state capital thanks to Copper King W. A. Clark's campaigning; Anaconda, Marcus Daly's choice, loses

C.1895 First dredge used in United States at Bannack, Montana

1895 Jake Hoover files first gold placer claims in area of Yogo sapphire dike
$38,000 mining ditch constructed from Yogo Creek to benchlands east of Yogo Creek Canyon
First claims located in Carbonate mining district

White Sulphur Springs gets electric lights

1896 Richard Harlow's Montana Railroad (the Jawbone) reaches Martinsdale; closest depot for Copperopolis ore

Jawbone Railroad reaches Leadboro, 3/4 mile below Castle Town

Miner - Mexican conflict in Neihart; Railroad moves Mexicans out and brings Japanese laborers in

Klondike gold rush begins, Bonanza Creek, Canada

1897 Forest Management Act, allowing for the withdrawal of land for agricultural or mineral development

Neihart, Barker, Running Wolf, Yogo, and Carbonate districts annexed to Cascade County

1898 New Mine Sapphire Syndicate, Inc., a British firm, mines Yogo Creek sapphires; open cuts and hydraulic strategies

Montana Central runs daily passenger trains from Neihart to Butte

Economic depression closes Castle's mines

Spanish - American War

1899 Montana Railroad establishes Lennep as a depot town

W. A. Clark buys U.S. Senate seat; Marcus Daly uses influence to persuade U.S. Senate not to seat him

Marcus Daly merges ACM with Amalgamated Copper Company, associated with John D. Rockefeller's Standard Oil Company

1900 Copper King Marcus Daly buys Copperopolis mineral prospects; Daly dies later in the year

Harlow links his Montana Railroad with Northern Pacific's line at Lombard on the Missouri

River: creates rail link between Castle mines and East Helena smelter

Montana School of Mines opens in Butte

1901 Monarch residents petition Diamond A of Nelhart to quit polluting Belt Creek with their tailings

1902 Castle Mountains become part of the Little Belt Forest Reserve

Daily "fish train runs between Great Falls and Neihart

1903 Copperopolis mines close; result of economic depression in Germany (1901) and labor strife in Butte and Anaconda mines

Great Northern pulls up tracks from Monarch to Barker

Barker-Hughesville becomes a deserted mining camp

Lewistown branch of Montana Railroad completed, connecting town to Harlowton

1904 American Sapphire Company takes over Yogo sapphire claims held by J John Burke and Patrick Sweeney; invest $30,000 to construct mill

Oil and gas placer claims located in Two Medicine mining district, none patented

1905 First oil well in Montana (Swiftcurrent Oil & Power #1), Glacier National Park

Forest reserves transferred from Department of Interior to Department of Agriculture
Industrial Workers of the World (IWW: Wobblies) organize

1906 Congress passes June 11 Forest Homestead Act
Clendenin townsite offered for sale; no takers
Creation of the U.S. Forest Service

1907 Milwaukee Railroad, leasing Harlow's Montana Railroad, removes Leadboro line
Forest reserves renamed national forests

1908 Anaconda Copper Mining Company builds Great Falls Reduction Works
Little Belt Forest Reserve consolidates with the Jefferson National Forest
Chicago, Milwaukee and Puget Sound Railroad purchases Richard Harlow's Montana Railroad for $3.5 million.

1909 Yogo-American Sapphire Company incorporates buys out American Sapphire Company for $60,000
First producing gas well in Montana (Swiftcurrent Oil & Power #1A, Glacier National Park)
Last Spike ceremony for Milwaukee Railroad at Gold Creek, four miles west of Garrison

1910 Martinsdale relocates townsite to be on Milwaukee line
Mountain Chief, and Chief of the Mountain claims patented, Lange Creek (Rocky Mountain Front); extracted melanterite, valued as a medicinal agent
Bureau of Mines, Department of Interior established
Great Fire burns millions of acres in Idaho and Montana
Glacier National Park established

1913 Sand Coulee coal mines begin production

1914 American Sapphire Company sells mine to English company
Opening of the Panama Canal, affecting transcontinental freighting
Women in Montana given the right to vote, six years before the 1 9th Amendment guarantees this right

1915 Anaconda Copper Mining Company locates limestone placer claims on Smith River at confluence with Dry Fork; proposes use for dam and power house site; claim patented

1917 Milwaukee begins electrifying its railroad, eventually from Harlowton to Avery, Idaho
Height of Montana's land boom

1916 Anaconda Copper Mining Company expends $2 million for the construction of an electrolytic zinc plant in Great Falls
Peak year of copper production
Yellowstone - Glacier Park Bee Line organizes to promote construction of the Park to Park Highway (Highway 89)
Jeanette Rankin, Republican, elected to Congress

	Rocky Boy's Indian Reservation created; Rocky Boy's Canadian Chippewa and Little Bear's Canadian Cree
1917-18	U.S. involvement in WWI
1918	Willow Creek (Castle Mountains) iron claims located
	Jeanette Rankin runs on Nationalist ticket for U.S. Senate against Democratic incumbent Thomas Walsh; Walsh wins
	Prohibition goes into effect in Montana
1919	Forest fire completely encircles Monarch, Neihart, and Barker
1919-29	Copper King and U.S. Senator W. A. Clark has interest in Big Seven silver and lead mine;
	Montana District (Neihart)
1920	Mineral Leasing Act disallows use or placer claims for oil and gas exploration
	Nationwide prohibition goes into effect
	Judith Basin County created
1921	Kings Hill Highway dedicated
1924	Strip mining begins at Colstrip
	U.S. citizenship granted to Native Americans
1927	T. C. Power estate sells Block P claims to St. Joseph Lead Company
	Barker receives electricity
	Jefferson National Forest becomes part of Lewis & Clark National Forest
1928	St. Joseph Lead builds 400 ton selective flotation mill and Leschen tramway rebuilds railroad; Barker district
	Yogo Lead & Zinc Company incorporates
1929	Yogo sapphire mines close
	Dams built below St. Joseph mill to impound tailings; Barker district
	Stock market crashes
	Drought strikes most of U.S.
1930	St. Joseph Lead Mining Company ordered to close by head office
1933	Civilian Conservation Corps (CCC) established
	Construction begins on Fort Peck Dam
	Prohibition repealed
	Butte miners on strike
1936	Butte, Helena, and Phillipsburg experience period of great metal mining activity
1941 -45	U.S. involvement in WWII
1941	St. Joseph Lead Company reopens
1942	St. Joseph mill working at 50% capacity
	Civilian Conservation Corps liquidated
1943	St. Joseph mill and mine close
1944	St. Joseph Lead company's holdings sold to Thorson Brothers and James Brazee
	Railroad to Neihart abandoned; last run on November 3

1946	Railroad tracks to Neihart torn out
	American Smelting and Mining Company purchases St. Joseph mine
	BLM created from GLO and Grazing Service
1948	First oil/gas well drilled on the Forest in Blackleaf Canyon (General Petroleum #1 Black Leaf well)
1952	U.S. Geological Survey identifies Yogo deposit as the most important gem locality in the country
1955	Multiple Use Mining Law
	Berkeley Pit Mine begins production
1956	Sidwell & Commercial Uranium Mines, Denver, buys up 145,000 of 150,000 shares in the
	British syndicate controlling Yogo sapphire mines
1957	Cumberland and Yellowstone mines (Castle District) become active, begin regular shipments of ore
1960s	Peter J. Antonioli and others purchase St. Joseph mine
1962	Malmstrom Air Force Base begins construction of ICBM launch facilities
1972	Chilean government nationalizes Anaconda Company copper mines
1974	Milwaukee Railroad ends electric operations
1974-75	AMAX and Exxon Mining Companies do exploratory work at Barker
C.1976	Yogo sapphire mines resume full-scale operations
1977	Atlantic Richfield (ARCO) buys Anaconda Company
1979	AMAX does exploratory drilling for molybdenum at Barker
1980	Milwaukee Railroad ends operation; coal production in Roundup falls drastically
1982	Anaconda Company turns off its pumps in its Butte mines; Berkeley Pit begins filling at faster than expected rate
1983	Joint venture announced between AMAX and Hecla Mining Company
	Anaconda Company closes its Great Falls smelter
1984	506 foot high smokestack of the Great Falls smelter removed as a safety hazard
1986-87	Under Abandoned Mine Land Reclamation Fund State of Montana posts and fences potentially hazardous mine sites
	Reappraisal of property; taxes on mining claims increase
	U.S. Minerals Exploration Company of Denver locates 5 placer claims in Barker
1994	613 pending patents for 8,595 claims being processed by BLM (59 patents for 257 claims in Montana)
1995	Cleanup work at Block P mill tailings ponds

III

CONTEXT BY REGIONS

REGION 1

Region one in the northeastern portion of the state is flat for the most part, but does have the Little Rockies where the Zortman and Landusky area drew some mining activity. The rest of the region is devoid of hard rock or placer mining activity. The Bearpaw Mountains had some placer mining, but little development and so is not covered. This area also spills over into region three in Hill County. The Zortman and Landusky district also known as the Little Rockies had some communities and is covered in some detail by the following context.

HISTORIC BACKGROUND ON ZORTMAN AND LANDUSKY

By: Robert A. Murray, Russell W. Bessette, and Anne McGeorge, of Western Interpretive Services, Inc.

Early Discoveries and Placer Mining

In the dimmest reaches of regional folklore, one finds stories that could be linked to early prospector activity in the Little Rockies only a few years after Montana's first gold discoveries. This is not surprising, since the range stands out boldly above the plains and is only a few miles from the Missouri River, which served as a principal transportation route to and from the gold region.

Chris Keyes is supposed to have found signs of paying placers somewhere in the region in 1864, but he was killed before his partner, John Lepley, could join him that year. Another old timer named Cyprienne Matt, is supposed to have named J.M. Arnoux, Tom Haley and others as discovering gold in the Little Rockies in 1866.[1] A party led by frontiersman William T. "Uncle Billy" Hamilton, reportedly prospected in the Little Rockies briefly in 1868.[2]

The first generally agreed upon paying placers were discovered in the summer of 1884. We might theorize that the earlier prospectors did not persist simply because they found little ore that would yield $15 per day. This figure was the minimum average that they felt was needed to have a paying placer.[3]

By 1884, however, a prospector's standards were appreciably lower. If he were a miner, he would likely be working year around for steady wages in one of the established camps. If he were a more typical placer prospector, then the alternative employment opportunities were diminishing; the great buffalo herds were gone; Indian-trading was becoming better organized and less open to the small operator. The burgeoning

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[1]Al. J. Noyes, In the Land of Chinook, (Helena: State Publishing Co., 1917) p. 35.
[2]ibid., p. 32.
[3]William B. Hazen, letters and report, in House Executive Document 45, 39th Congress, 1867.

range-cattle industry offered only $30-a month-and-found. So, the more adventurous holdovers from the placer period spent their winters as "wolfers," or as freighters, and roamed the hills in the summer, hoping for some $5 a day, diggings.[4] Others wintered at the Indian Agencies, and the wolfers tended to congregate at Rocky Point, an old river port not far from the Little Rockies.[5]

A number of these men worked through the Little Rockies in the summer of 1884. "Dutch" Louis Meyers was working in the valley of Beauchamps Creek in June, when he was joined by Frank Aldrich and Charlie Brown. Working systematically together, they found paying gravel on the 15th of June. It averaged over 12 cents to the pan, and occasionally delivered as high as $3.50.[6]

Powell "Pike" Landusky relayed the news to the mining camp of Maiden in the Judith Mountains not far away. Mat Foley, Sport Welsh, Denton Doer, Billy Legg, William Skillen, Willard Duncan, Clois Stagdman and Tony McFarline were among the other prospectors known to be in the district during this period.[7] At its peak, Skillen thought that as many as 2,000 men were involved in the stampede that year.[8]

The area lay within the major Indian reservation for the Northern Tribes, and federal troops were sent in to investigate the placer activity and keep order at the peak of the rush.[9] As was so often the case with placer rushes, the diggings did not contain enough easily worked gold to sustain the peak population. Low profits and the uncertainty of continued tenure on the Reservation deflated the boom.[10]

By the time the Agreement of January 21, 1887 settled a new boundary for the south end of the Gros Ventre and for the Assiniboine Reservation on the crest of the Little Rockies, placer activity was pretty well over.[11] Very little placer activity paralleled the early years of lode mining development in the region. It has been characterized as a day-labor proposition, with only one lucky prospector taking out a big haul of $1,200 in a single season.[12]

Subsequent to 1904, placer work was apparently at a standstill until the depressed labor markets of the 1930's brought forth a number of hopeful workers. But to their disappointment, from 1928 to 1948 their efforts yielded only 362 fine ounces of gold.[13]

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[4]Robert A. Murray, "History," in: Michael L. Gregg, Cultural Resources Inventory and Evaluation in the South Beapaw Planning Unit, Reports of Investigations, No. 7, (Butte: Mineral Research Center, 1978), pp. 105-140.
[5]ibid.
[6]Frank Aldrich, quoted in Noyes, p. 36, from an old issue of River Press.
[7]William Skillen, quoted in Noyes, op.cit., p. 33.
[8]Ibid., p. 33.
[9]ibid., p. 33-34.
[10]Muriel Sibell Wolle, Montana Pay Dirt, (Chicago; Sage Books, 1963, pp. 372-373.
[11]U.S. Statutes, v.25:113.
[12]Walter H. Weed, "Ore Deposits of the Little Rocky Mountains, Montana, "Engineering and Mining Journal., v. 61, pp. 423-424, (May 2, 1896).
[13]Charles J. Lyden, The Gold Placers of Montana, Montana State Bureau of Mines Memoir 26, (Butte: Montana School of Mines, 1948), pp. 114-117.

But, beginning in 1893, hard-rock prospectors set in motion an entirely different level of development.

Early Hard Rock Years

Pike Landusky is supposed to have made the first lode discoveries in the Little Rockies, locating the Julia in 1887 and the Gold Bug in 1890. Then in 1893, he and Robert Orman found high-grade ore on the August, which they named after the month of the discovery.[14] The August was located within what was then the boundary of the Fort Belknap Reservation. This did not bother Landusky and his partners. They worked the c1aim at night, excavating 65 feet of shaft, and removing ore that brought $32,000 from an Illinois smelter.[15] Word of their activity leaked out, however, and by 1894, newspapers on the region were full of items about the prospecting going on in the Little Rockies.[16] Part of the new finds lay within the Reservation, and Montana politicians secured the appointment of commissioners to negotiate further land concessions from the Indians. Headed by George Bird Grinell, the commission secured the services of Walter H. Weed, a geologist who had acquired a prestigious reputation for his writing on the geology of the Butte area, to assist in identifying the mineral lands that were to be bought from the Indians and opened up for development.[17] Weed assessed the area, made his report to the commissioners, and subsequently wrote two scholarly articles on the geology of the region.[18]

With Weed's recommendations in hand, the commission on October 9, 1895 concluded an agreement changing the Reservation boundary so as to exclude the mineral lands. This effectively opened up the area to development.[19] There still remained the problems imposed by the location, which was over fifty miles from the railroad, with nothing but the poorest of back country trails over which to haul equipment to the mines, and over which it was expensive to haul out even high grade ore. This factor, more than any other, made mining men slow to come forward with development capital on the always uncertain early data about the extent of these gold deposits.

Nevertheless the pioneers of the area persevered. Landusky was killed in a celebrated fight in 1894, but his heirs, along with G.L. Manning, proceeded to develop the Gold Bug, in association with another group that carried on the actual work under the supervision of M.H. Jacobs, from Hailey, Idaho.

The Gold Bug in the mid-1890's had a shaft (a narrow, vertical excavation) 40 feet deep, leading to three -drifts (horizontal tunnels at different levels off the shaft) and a winze

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[14]Wolle, op.cit. pp. 373-374

[15]Walter M. Emmons, "Gold Deposits of the Little Rocky Mountains, Montana," Contributions to Economic Geology, 1907, (Washington, D.C.: 1908), Part I., p.115.

[16]see especially: Havre Advertiser, July 19, 1894. Helena Independent, September 17, 1894.

[17]Indian Agent Luke C. Hays, "Report" in Report of the Commissioner of Indian Affairs, 1896, (Washington, D.C.: GPO, 1896) pp. 188-191.

[18]Walter H. Weed, "Ore Deposits of the Little Rocky Mountains, Montana," Engineering and Mining Journal, v. 61 (May 2, 1896), pp. 423-424.

[19]U. S. Statutes, v.29, 350. also: Edward E. Barry, The Fort Belknap Indian Reservation: The First Hundred Years, (Bozeman, Montana: Big Sky Books, 1974) pp. 87-88.

(a vertical excavation off some point on a drift) that dropped another 50 feet from the lowest drift. Various ore bodies ranged in assay value from $4.00 to $100.00 and some select rock could be found that would run as high as $1000 per ton.[20]

0. P. "Pete" Zortman, George Putnam and E.W. King formed the Alder Gulch Mining Company. Their first sizeable development was the Alabama, which produced about $55,000 in high grade ore in 1899 and 1900.[21]

Because only very high-grade ore would support the cost of shipment, there was considerable interest in setting up mills for processing the lower grade ores. This was an expensive proposition, and the first efforts were nonetoo-successful. Pike Landusky first tried to mill with an arrastra (a stone circularly dragged across another stone used to grind ore) near the Gold Bug. Then, not long before he died, Landusky built a small three stamp mill on Mill Gulch just above the town of Landusky. He also tried to treat ores from the Gold Bug, the Ann, and the Little Ben. These ventures did not work out well, because the telluride (non-metallic element) content of the ore prevented effective amalgamation.[22]

Jacobson, Torgenson and Nobin, a North Dakota group, bought the Gold Bug from Landusky's heirs and organized the Mission Peak Mining Company.[23] They built a ten-stamp mill with a ten-inch Balke jaw crusher, two Frue Vanners, and amalgamation plates in 1902 just east of Landusky. Like the earlier mills, it could not recover enough of the gold from the telluride ores and it closed down after a short period of operation.[24]

The years from 1893 to 1903 were thus very frustrating for the many that placed their hopes on development of the area. Just after the discouraging failure of the Gold Bug Mill, new faces appeared on the scene and changed the course of development while dominating the affairs of the district for many years.

Intensive Development, 1903-1923

Charles Whitcomb in 1903 sold a ranch he owned and operated to B.D. Phillips, the leading sheep man of northern Montana. Whitcomb then moved to the mining country and obtained an option on the Independent claim. Together with Bob and Bill Coburn, he obtained a loan from Phillips in the amount of $7,000 to finance development. They organized as the Little Rockies Exploration Company and carried out prospecting and development work over the next few years.[25]

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[20]Weed, op.cit., p. 424.
[21]Emmons, op.cit., p. 97, and pp. 112-113.
[22]Frank B. Bryant, "History and Development of the Landusky Mining District, Little Rocky Mountains, Montana," in: John M. Parker, (ed.), Guidebook, 4th Annual Field Conference, (Billings: Billings Geological Society, 1953) pp. 160-163.
[23]ibid. p. 160.
[24]Emmons, op. cit., p. 100.
[25]Walter W. Phillips, "Benjamin Daniel Phillips and Family in Montana," unpublished manuscript, Montana Historical Society, p. 83. also: Gladys Costello and Dorothy Whitcomb Klimper, Top o' the Mountain (n.p., c. 1976), pp. 33-35. Emmons, op.cit.

At this point, there was but one mill in the District that worked. That was the newly constructed 100 ton cyanide mill of the Alder Gulch Mining Company west of Zortman, Whitcomb and his associates now approached B. D. Phillips to finance another mill to process ore from the Independent and other claims. Phillips put up $75,000 and received two-thirds of the stock of the newly organized Ruby Gulch Mining Company.[26]

The new organization then bought up a group of adjacent claims including the Ruby, the Mint, and the Divide, and opened the Ruby Mine. After opening surface operations on these claims, and carrying the ore down to their new mill on a gravity tram, they extended a tunnel at mill level from the Independent to cut the Ruby ore body deep in the mountain.[27]

Here they found that the footwall of the vein supported a body of brecciated ore that fractured easily and flowed from its own weight. They drove a haul way parallel to the vein and about 25 feet back inside the solid poryphry formation, and ran inclined raises (vertical upward excavated diggings) to tap the shattered ore. This made it possible to mine at a very low cost and to derive a profit from ore that contained as little as $2.00 per ton in recoverable values. The company further found that there was just enough silver in the ore to offset what gold was lost in the tailings. With this ore body at hand they expanded their mill in Ruby Gulch to 300-ton capacity.[28]

This first Ruby Gulch mill had a No. 3 Gates crusher, a screening system that sent the fines from the crusher on to the tanks, while the oversize rock was run through three sets of roll crushers. The plant had six 300-ton tanks and six 110 ton tanks. Ore was usually leached for a week. The mill was powered like the earlier ones in the district by a steam engine, using wood for fuel. It consumed eight cords a day at a cost of $8.00 per cord.[29]

In 1907, Whitcomb, Phillips, the Coburns, and Louis Goslin organized the August Gold Mining Company and bought up that group of claims. They bought up the old mill in Landusky from the Mission Peak Mining Company and moved it up the mountain to the August. The stamps were torn out and roll crushers and cyanide tanks were installed.[30]

Throughout the early years of operation the high-grade ore was hauled out to the railroad at Dodson, and shipped to East Helena for smelting. There were many such pockets of high grade, and they contributed significantly to the development capital for this tangle of interrelated companies.[31]

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[26]Emmons, op-cit., p. 97 and pp. 99-100. Phillips, op.cit., pp. 83-84.
[27]Phillips, op.cit., p. 83.
[28]Phillips, op.cit., pp. 85-87.
[29]Emmons, op.cit., p. 99.
[30]Bryant, op.cit., p. 160.
[31]Costello and Klimper, p. 45-52.

In 1909, the Ruby Gulch Mining Company bought the Alabama group of claims from the Little Rockies Exploration Company and also bought up a two-thirds interest in the August Mining Company. This transaction brought most of the better claims in the district, along with the milling facilities under their control.[32]

During the years 1903-1912, the towns of Landusky and Zortman expanded rapidly in population, and at the Ruby Gulch Mill, there was a small village, at first called Whitcomb. Zortman reached a population of around 200 in this period, with a hotel, two general stores, two saloons, a livery stable, and the mining company offices. Landusky and Whitcomb were much smaller. A stage line connected Zortman to Dodson, and another such line connected Landusky to Harlem.[33]

Growth of mining activity was one of the factors that led to a realignment of the governmental units in the area. Blaine County was first split from Choteau County, and then was divided to yield Phillips County, which under B. D. Phillips' influence, was designed to include the gold districts.[34] Gold production of the district amounted to $264,910 in 1908, rose to $700,000 in 1909, and remained at a high level until 1913.[35] In that year, fire destroyed the Ruby Gulch Mill.

The Whitcomb and Phillips' interests had access by this time to considerable capital. In 1913-1914 they constructed a modern fine-grinding mill of 600-ton capacity designed by Milton Leydig in Ruby Gulch. Cordwood was by this time in short supply and too expensive for boiler fuel, so the developers cast about for another source of power. Unable to negotiate a successful agreement with the Montana Power Company, the company bought the Sadie Black Ranch of Rock Creek, where there was a large warm water spring. Here they built a dam and penstock to carry this water and then installed a 200 horsepower Pelton wheel and generator set.

This supplemented the steam plant at the mills, but they needed still more power for full production so they opened a lignite vein near the Missouri River, and built a 750 horsepower steam power plant nearby, which burned 70 tons of coal a day. A transmission line carried power to the mines.[36]

With the power plant in operation by 1916, the mines ran at peak activity through 1917. Early in 1918 a number of problems arose. Average ore values dropped, the miners' union struck for higher wages, and this, in the midst of a general labor shortage, brought about by the demands of wartime industries, shut down mining operations after taking out only 219,350 tons of ore averaging $1.94 per ton.

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[32]Phillips, op.cit., pp. 88-89.

[33]R. L. Polk and Co., 1914 Directory for Minnesota, The Dakotas and Montana (Minneapolis:Polk, 1914). There is a wealth of detail on the activities of the community in 1907-1909 in the files of the Little Rockies Miner for those years in Montana Historical Society, Helena.

[34]Phillips, op.cit.

[35]U. S. Geological Survey, Mineral Resources of the United States, (Washington; GPO, 1909 on, annual volumes-).

[36]Phillips, op.cit., pp. 88-

During the years of the shutdown, Walter W. Phillips (son of B.D. Phillips) completed work on a degree in mining engineering. In the spring of 1920, he went to the Ruby mine and carried out an extensive prospecting and sampling program while George Whitcomb (son of Charles) supervised the repair work needed to get the mine back in operation. By November lst of that year, Phillips had assayed enough ore to be confident about the prospects for reopening the mine.

Anaconda Copper Mining Company took an option on the property soon after that, on making their own examination, relinquished the option. So, with Walter W. Phillips as superintendent, the Phillips' interests set about reopening the mine. They rebuilt the power line, dehydrated the oil in all the transformers, overhauled the mill and power plant, developed a new water source in Alder Gulch and ran a mile of 5" steel pipe to the mill.[37]

Operations resumed in December of 1922. The company drove a tunnel on the 600 foot level reaching the bottom of the ore body. Then they found additional good ore at the 300 and 500-foot levels, and a large body of high grade ore on the Alabama.[38]

At this point new problems developed. An eight-day rainstorm brought 16 inches of rainfall and flooded the lower mine workings. In October of 1923, the mill burned down and operations at Ruby Gulch came to a halt. At this point the company decided not to rebuild, since rising operating costs could not be supported by the then current $20.67-an-ounce gold price.[39] This effectively closed the intensive development period.

Small Scale Operations and a New Mining Boom 1923-1942.

Through the rest of the 1920's, the district was in a slump, with only Whitcomb generating small-scale new activity. The Unit Leasing Company took a little high grade out of the August in 1924, for a total production of less than 2,400 ounces of gold.[40] In 1925 they cleaned up the old tanks at the Ruby Gulch property and got only about 9 ounces of gold.[41]

Whitcomb's Beaver Creek Mining Company cleaned up its old machinery in 1926 and got about 32 ounces of gold. The same company ran on a small scale in 1927 and got about 120 ounces of gold, and struck some high grade in 1928 that brought their take to 223 ounces. A little high grade yielded only 57 ounces in 1929.[42]

B. D. Phillips died in 1926, and the family sold their holdings in the mining country and concentrated on ranching and real estate operations from that point on.[43]

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[37]ibid., p. 90. also: U.S. Geological Survey, Mineral Resources...1918. The check register of B.D. Phillips Co., at MHS reveals only two watchmen on the payroll in this period.
[38]Phillips, op.cit., pp. 130-153.
[39]ibid., pp. 130-153.
[40]U.S. Bureau of Mines, Gold, Silver, Copper, Lead and Zinc in Montana, 1924, part I., pp. 346-359.
[41]ibid (1925 ed.), Part I, p. 636, p. 653.
[42]Andrew V. Corry, Some Gold Deposits of Broadwater, Beaverhead, Phillips and Fergus Counties, Montana, Memoir #10, (Butte: Montana State Bureau of Mines, 1933. pp. 30-32.
[43]Phillips, op.cit., pp. 160-162.

Whitcomb remained steadfastly faithful to the prospect of reopening mining operations in the Little Rockies. In 1929, he interested George T. McGee, Norman Holter, Charles Powers, John Corette and James Finlen in backing an exploratory venture. In the spring of 1930 they struck a streak of high grade at the August Mine and took out forty tons of ore that brought in $27,400.[44] On the strength of this showing, they formed a new organization, the Little Ben Mining Company, and reopened the August to exploit all the high grade they could.[45] This time they took advantage of the changing technology of power production and equipped the mine with a 100-horsepower Fairbanks-Morse diesel engine trucked out from Chicago early in 1933.[46]

By April of that year, the company was planning a new cyanide plant, and was shipping high grade that ranged from $6.00 to $3,300.00 per ton.[47] At its peak, the Little Ben's operations on the August employed 72 men.[48] In March of 1935, the Little Ben Mining Company paid a 4% dividend, and expanded its mill capacity that summer to 150 tons per day. They added a 225 horsepower diesel to the power plant.[49]

For the late 1930's detailed cost-accounting figures are available for the producing mines of the district. The Little Ben Mining Company had gross receipts of $266,824.71, and a net profit of $73,619.06 in 1935. For 1936, the gross was $267,039.52 and the net profit was $68,075.12. In 1937, the company grossed $342,152.68 and had a net profit of $108,058.62. 1938 saw a gross of $257,128.47 but increasing costs brought the net profit down to only $9,563.36. In 1939, the gross take was $247,567.44, and the net profit was $47,031.62.[50] This level of operation was, of course, largely made possible by the 1934 increase in the price of gold to $35 per ounce. When further price increases were not forthcoming in the face of rising costs, the company shut down and liquidated as a corporation. All of its equipment was sold and removed in 1942, and Katie B. Whitcomb bought up the claims during or shortly after World War II.

Charles Whitcomb, in addition to reopening the Little Ben, set in motion another major mining venture in the area. Whitcomb convinced Butte mining engineer Carl J. Trauerman that he could find high-grade ore. In the meantime Minneapolis junk dealers who planned to salvage the metal on the property had bought the mine. Whitcomb and Trauerman acquired the stock owned by Phillips in the Ruby Gulch Mining Company, bought out the Minnyapolis junk dealers, and reopened the Ruby and the Alabama early in 1935.[51] They put in a new cross cut to the big glory hole and hit soft ore that was very high grade. This and all the high grade ore (considered to be high grade if it would yield more than $100 per ton) was shipped to the smelter in East Helena. The lower grade ore was stockpiled until a mill could be built. By 1936, a 300-

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[44]Bryant, op.cit., p. 160. Costello and Klimper, op.cit., pp. 76-81.
[45]Carl J. Trauerman, "Old Mines Being Reworked.." Rocky Mountain Husbandman, 24 November 1932.
[46]Engineering and Mining Journal, v. 134, #1, January, 1933, p. 42.
[47]Engineering and Mining Journal, V. 134, #4, April, 1933, p. 175.
[48]Wolle, op.cit., p. 380.
[49]Engineering and Mining Journal, v.136, #3, March, 1935, p. 134 ibid.: v.136 #9, September, 1935.
[50]Original records, mining files, Montana State Bureau of Mines, Butte.
[51]Wolle, op.cit., p. 380, Costello and Klimper, pp. 83-87.

ton cyanide plant was constructed 1argely out of the profits of the early shipments of the high-grade ore.[52]

Two weeks before the first gold bar was poured from the new operation, Charles Whitcomb died. This was in 1936; the Whitcomb's son, George, who was directly involved in the management of the properties, was mysteriously killed in Helena in 1937.[53]

Cost accounts for the 1930's show that in 1935 the Ruby Gulch Mining Company grossed $37,487.79 and made a net profit of $20,017.18 on operations before the reorganization.[54] For the balance of the year the gross was $89,918.86 and the net was $46,674.96. With the new mill in operation in 1936, production rose to gross $269,358.42 with a net profit of $65,097.42. In 1937, the operation grossed $509,644.28 and yielded a net profit of $202,205.72. In 1938 there were 120 men on the payroll with a gross take of $439,438.63, and a net profit of $121,602.99.[55] In 1939 the Ruby Gulch Mining Company grossed $424,129.40 for a net profit of $114,827.76.10 Detailed cost and production figures are not available for 1940-42, but the mine operated during those years, employing 110 men in 1940.[56]

Like the Little Ben, the Ruby Gulch Company used diesel power during this period, or, two 300 HAP Venn-Severin and one 100 H.P. Cummins for a combined total of 700 H.P. for ore hauling by electric locomotive.[57]

The Ruby Gulch Mining Company's operations were marginally profitable, but were shut down in 1942 by the war production board's order L-208 that withdrew the labor and equipment priorities from precious metals mines.[58]

Through all of this second boom period, the towns went through as many changes as the mines. Zortman was swept by a disastrous fire in 1929 and another during the shut down period in 1944.[59] A 23,000-acre forest fire in the hills surrounding the mining area burned for nearly six days in the summer of 1936.[60]

With gold mining shut down, there was little activity in either town during the war years, though there were hopes of renewed prosperity once the war was over.

Post-War Mining

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[52]Engineering and Mining Journal, v. 136, #9, Sept. 1935, p. 470. Engineering and Mining Journal, v. 138, #11, Nov. 1937, p. 76. Engineering and Mining Journal, v. 138, #6, June, 1937.
[53]Original records, mining files, Montana State Bureau of Mines, Butte. also: Costello and Klimper, op. cit., p. 76ff.
[54]Engineering and Mining Journal, v. 139, #8, August of 1938.
[55]Original records, mining files, Montana State Bureau of Mines, Butte.
[56]ibid.
[57]ibid.
[58]Engineering and Mining Journal, v. 143, #12, December,1942.
[59]Clipping files, "Zortman" Montana Room, Billings Public Library.
[60]Wolle, op.cit., also USFS files, Lewis and Clark National Forest.

Newspaper reports in May of 1945 forecast that the mines in the Little Rockies would reopen as soon as the government lifted Order L-208.[61] That event occurred on June 16, 1945, although the scarcity of equipment and labor continued until after the end of the hostilities with Japan that summer.[62]

Katie B. Whitcomb now owned all the mining claims of the former August and Little Ben properties near Landusky. The Whitcombs and Carl Trauerman owned most of the stock in the Ruby Gulch Mining Company. Operations were resumed at the Ruby on July 1, 1946, with Ed Scholz as manager, August Rambosek as mine superintendent, and Max P. Klimper (Mrs. Whitcomb's son-in-law) as mill superintendent. By August they were working 3 shifts of men in the mine and the mill, and Zortman began to grow once more.[63]

About 55 tons of high-grade ore were taken from the Little Ben holdings at the Alabama by one operation.[64] The old Ruby Gulch cyanide mill was put back into operation, and, during the last half of 1946, it processed 30,000 tons of ore that yielded gold and silver totaling over $80,000 in value. The mining technique for the Ruby Gulch operation was to slab off rock from selected portions of the glory holes with air-powered jack hammers and drop it down through the old chutes to the haul-way.[65]

Consequently in 1947 a coyote drift (a narrow, horizontal tunnel) was run within the west wall of the Alabama Glory Hole. Charges were placed along the Coyote drift totalling 30,000 pounds of nitramum C explosive. These were ignited simultaneously and the west wall of the Alabama Glory Hole collapsed into the bulldozing chambers (a chamber above the chute that leads to the haul way).[66] The ore in the bulldozing chambers was subjected to secondary blasting and hand breaking until it passed through the grizzlies (iron bars to control the size or ore rock passing into the chute) to the haul way and then to the mill. This permitted low ore handling costs and allowed yearround work.[67]

Sharp increases in labor costs plagued the company over the next few years. Despite the fortuitous discovery of high grade in mid 1949, the company ran at a small loss that year. Throughout 1949, Trauerman made considerable effort to sell the property to various larger mining concerns.[68]

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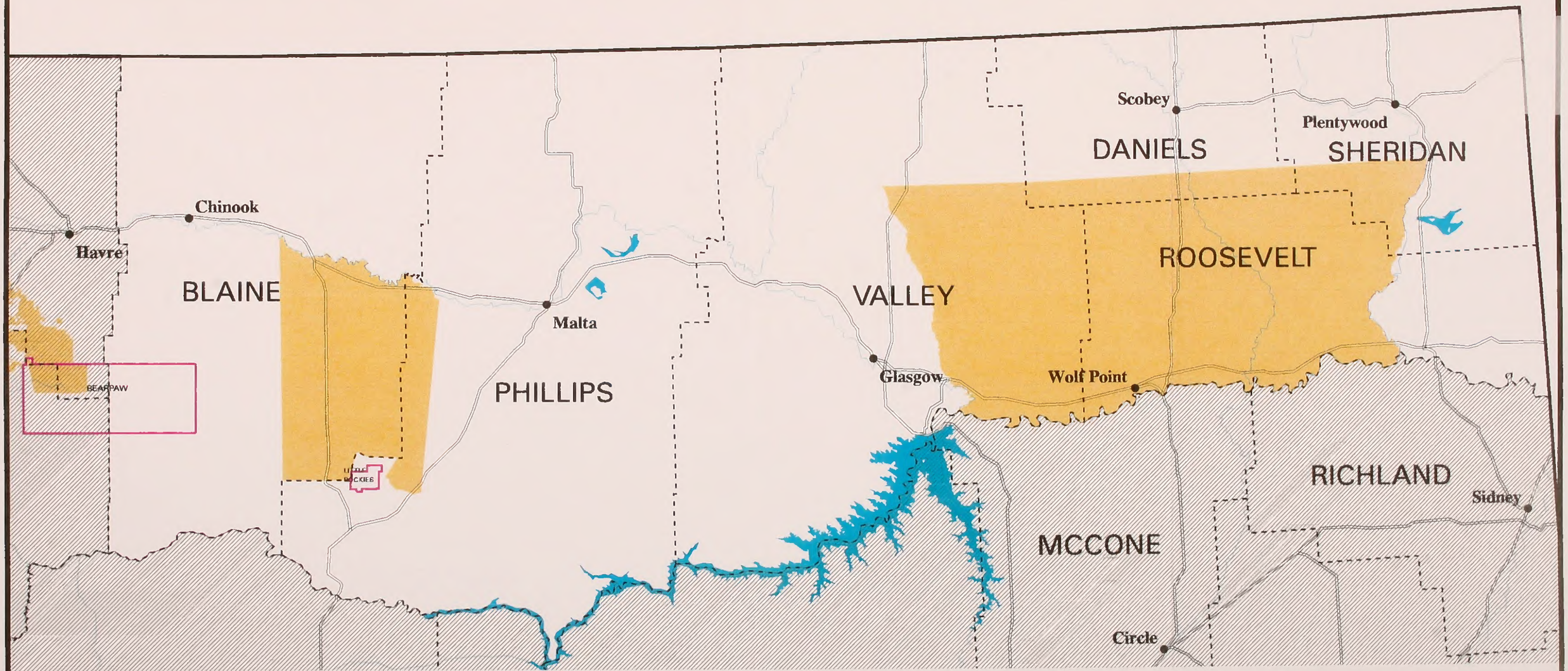
[61]Helena Independent Record, May 21, 1945.
[62]Ibid., June 17, 1945.
[63]Ibid., August 11, 1946.
[64]U.S.G.S., Minerals Yearbook 1946, (Washington, D. C., GPO, 1947)p.21.
[65]Millard L. Reyner, Edgar A. Scholz and Paavo P. Pumala, "Glory Hole Operation Uses Coyote-Drift Blasting," Engineering and Mining Journal, August, 1948, pp. 75-77.
[66]ibid.
[67]letter, M. W. Engle to Carl Trauerman, in SC1307, Montana Historical Society, 15 September 1949. also: Engineering and Mining Journal, V.150, #2, July, 1949, p. 175.
[68]Trauerman Letters, SC 1307, Montana Historical Society.



Scale of Miles
0 10 20 30

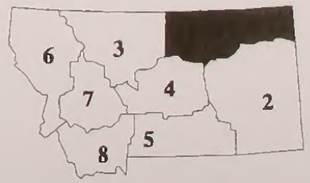
Albers Equal Area Projection,
centered at 109.5 W,
standard parallels at 46 and 48 N.

Montana State Library
Natural Resource
Information System
99nris494-1 - April 19, 1999

- Memoir 15 district - mining district boundary interpreted from MT Bureau of Mines & Geology Memoir No. 15, Plate 1; district numbering is from Sahinen (see NOTES).
- New district - located and named by the Abandoned Mine Reclamation Bureau (AMRB), Montana Dept. of State Lands to facilitate mine inventory; new districts are not numbered.
- Memoir 15 district boundary not used by the AMRB.
- Stream
- Highway
- County Line

- Outside of Region 1
- National Forest
- National Park
- Indian Reservation

Region 1



III - 11 - MAP 1

All serious mining activity ceased by 1951. Occasionally small lease operators would do some assessment or exploration work, but only 6 ounces of gold were produced from 1951-1959.[69]

By 1957, the property passed into the hands of its current owners,[70] and today the community pins its hopes on a reopening of these old properties for the fifth time.

Over the various periods of production, a total of around 380,000 ounces of gold have come out of the Little Rockies, an amount that in todays' dollars would total at least $60,000,000. Silver also played a significant role and, according to Ed Scholz, 500,000 to 1 millon ounces of silver were taken from the various mines. Clearly the mines have played a significant part in the economy of the region.[71]

Historic Overview of Zortman & Landusky
By: Mitzi Rossollon

Primary and secondary sources rarely mention the small mines that operated in the shadow of the Ruby Gulch and Landusky area mines. A few longtime area residents recall the work and lives of miners in the 1930s and into the early 1970s. The lives of earlier small-time miners were probably similar to those of the past 60 years. These men worked individually or with one or two other men to prospect and develop quartz claims. Few, if any, of the small mines ever reported any production. Instead, the mining was merely for subsistence and the remote chance to strike it rich. These men often supplemented their income by working at the large mines when they were in operation.[72]

While the literature suggests peaks of small-scale mining activities in the late 1890s and 1930s, both archaeological and oral historical data paint a more complicated picture. The remains of small mining camps dating between about 1905 and 1920 are not uncommon, nor are those 1940s and later camps remembered by local residents. These data indicate that the small-scale miner continued to operate on the fringes of the Ruby Gulch and Landusky area mines up to the 1970s.

While mining dominated the local economy, other work was done in the Little Rockies. However, most residents were tied in some way to the mines because they supplied goods and services. For example, there was apparently a high demand for wood, which was used first mostly to power steam equipment and at all, times for timbering in the mines and for domestic use. Indians from the Fort Belknap Reservation cut and hauled wood and freighted goods to the mines.[73] The majority of the local people who provided goods and services resided in three Little Rockies communities--Landusky,

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[69]A.H. Koschmann and M. H. Bergendahl, Principal Gold Producing Districts of the United States, U.S.G.S. Professional paper 610, (Washington D. C., GPO, 196) p. 167.
[70]Mining World, August, 1957, p. 77.
[71]Koschmann and Bergendall, op.cit., p. 167.
[72]Azure, Bert, 1990 Personal communication with author, 7/15/90. Zortman.
[73]Fort Belknap Indian Community, 1982 Recollections of Fort Belknap's Past. Harlem.

Whitcomb (at the Ruby Gulch Mill), and Zortman, the latter being the largest of the three.

Many of Zortman's early-days residents took up desert land and enlarged homestead claims on the plains south of the Little Rockies in the 1910s.[74] Most of these small ranch operations were short-lived, however. The large ranches held by the Phillips and Coburn families were, by far, the most significant agricultural operations in the area during the historic period.[75]

The Little Rockies was included within the boundaries of the Jefferson National Forest that was established in 1908.[76] One presumes that the Little Rockies was the awkward little sister to the more productively timbered forests that were also administered by the Jefferson Forest. The poor character of the timber in the Little Rockies was a significant factor in the decision to transfer the lands from the U.S. Forest Service to the Bureau of Land Management.

REGION 2

In the southwestern portion of Montana region 2 stretches from the Missouri River South to Wyoming. It is the largest region, but is rolling hills and bad lands with no historic hard rock or placer mines.

REGION 3

The northcentral portion of the State has some of the Rockies foothills and the Sweetgrass Hills so this region has had some limited hard rock and a little placer mining. The first of the areas is the Sweetgrass Hills, located in the northcentral portion of this region, and was not real productive, but the gold discoveries did help a few communities develop. The two districts in the Sweetgrass Hills were the Gold Butte and the West Butte. The Second area in this region was the Neihart district that was in the southern portion of the region southeast of Great Falls right down near Judith Basin and Meagher counties. This district had much more infastructure and lead to longer standing communities.

SWEETGRASS HILLS
By: Ken & Ellen Sievert

The first discovery-of gold, in the Sweetgrass Hills, while not a highly productive strike, was enough to entice increasing numbers of prospectors to the area. Until the vein was worked out, it is said to have yielded 25 cents in colors for every shovel of pay dirt, and the discovery canyon was appropriately called, "Two Bits Gulch." Pay dirt, however,

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[74]Burrows, Ellen, 1978 "Zortman." In The Yesteryears, compiled by the Phillips County Historical Society, Malta, pp. 199-204. Griggs Printing and Publishing, Havre.

[75]Murray, Robert A., 1978 "Historic Background." In Cultural Resources Inventory: Zortman and Landusky Mining Tracts, by Bonnie Hogan and Lynn Fredlund. Mineral Research Center, Butte. Submitted to Westech, Inc., Helena.

[76]Ruebelmann, George N., and William S. Hubbell, [1986] Cultural Resource Assessment of the Little Rocky Mountains, Draft. Ms. on file, Phillips Resource Area, Lewistown District, Bureau of Land Management, Malta.

comes in different forms, and Tony Fey's one room store, near West Butte, grew into a lucrative mercantile business, which became the basis for the town of Gold Butte. Meanwhile, near East Butte, another community was forming to serve the growing needs of area residents. Whitlash built the first "inland" post office in 1892, and Hill area residents no longer had to make the long trip to Fort Benton for supplies and mail. Alfred and Tom Strode established the town of Whitlash on Half Breed Creek, which in addition to the post office soon had a 7-room hotel, general store, creamery, blacksmith shop, dance hall and saloon. Gold Butte also continued to expand services, and provided the first area school in 1895. The Whitlash School opened in 1897.

The Lethbridge News reported on the growth of the 400 square mile area around the Hills in 1894, in which they concluded the area was being "taken over by sheep outfits", with 40,000 to 50,000 sheep and only one horse ranch. There was no mention of cattle and settlers numbered about 100.

Prospecting and mining continued in the area until about 1900, when most of the gold had been taken from the main claims. The Great Northern took claims in 1896 and opened several mines all above Tootsie Creek on Mount Royal. Probably no more than 2000 ounces of gold came from placers near Gold Butte, and only small amounts of gold and other minerals from East Butte.

The community of Chester saw its beginnings on the bank of Cottonwood Creek, where ranchers of the 1880's paused to rest on the long trail drive to the railhead in North Dakota. Three to five 12-horse freight wagons hauled freight from Chester in the early 1900's. The "Old Freight Road" carried supplies to Whitlash and then east to the thriving mining town of Gold Butte.

MONTANA (NEIHART) MINING DISTRICT
By: Zane L. Fulbright

The development of the Neihart district occurred at the expense of the Barker district. As prime claims were taken in Barker, and as the less promising ore bodies played out, miners began looking elsewhere to stake their claims. The first sign of color in what became Neihart attracted miners from districts scattered all over the territory.

In 1876, James L. Neihart arrived in Montana, set on making his fortune in the mining business. His first attempt at success occurred at Virginia City, where he worked a placer mine for two years. After failing to become wealthy, he left that district and prospected throughout the territory. He arrived in the Belt Mountains in 1881, where he, along with John C. O'Brien, and Richard Harley, located the first mine in the Neihart area. The Queen of the Hills mine revealed a rich silver and lead deposit, attracting the interest of outside investors. In the spring of 1884, the Queen of the Hills was bonded to Butte investors for $50,000. After they excavated 280 feet they pronounced the claim valueless, at which point the original owners reassumed control. With a little more work, they hit ore in an uprise running all the way to the surface. The partners then formed the Queen of the Hills Mining Company, operating the Queen of the Hills,

Homestake, and O'Brien claims. They proceeded to extend the main tunnel and sink a three-compartment shaft, increasing the exploratory and extractive potential of the mine. In 1894 the Conrad brothers of Great Falls acquired controlling interest in the company, renaming it the Queen Mining and Milling Company, hiring H.B. Hill as general manager. The Neihart Herald Souvenir, 1895, essentially a promotional and historical 'Who's Who" of Neihart, described the Queen of the Hills group as having a *magnificent and substantial' shaft house and a "commodious' power house. "It was here," it continued," that a test was made of operating hoists and drills by electricity, at the same time lighting the mine by that subtle fluid."[77]

The mining town of Neihart developed into an important supply center for miners and prospectors in the area. Early in its existence it was bigger than Great Falls. Population figures are not always reliable however; with each rumor of a strike in the camp and in other camps the population might wax or wane. In 1884 Neihart had a small population of 71 men voted in the election. Three factors influenced this low level of activity: a mining stampede in the Little Rockies, an exodus to Butte and Maiden mines, and the Mountain Chief mine was the only one employing workers. In 1885 the Rocky Mountain Husbandman ran an article, copied in Fort Benton's The River Press, highlighting the development in this mining boomtown. According to the article, Neihart, in its youth, already had two saloons, two eatinghouses, one private boardinghouse, post office, store, blacksmith shop, Chinese wash house, barber shop, butcher shop, two stables, 24-25 houses with roofs, 24-25 houses without roofs, and a number of tents. The creek bottom for five miles was staked into town lots, anticipating the community's growth and development. The Frisco Mining Company platted the surfaces of the Frisco claim into lots; many substantial houses, as well as the 60-room Frisco Hotel rose on this land.

Even in this period of optimism the fortune of Neihart fluctuated. From April into June of 1885 the mines were busy. The Broadwater group, consisting of the Montana Belle, St. Julien, Minnehaha, Maude S., and Dickens, were in operation on the west side of Neihart Baldy. In June the mines, which had employed an average force of 100 men at $3.50 a day, shut down. Upon C.A. Broadwater's death the group sold to W.J. Clark, et al., for $165,000. Later that same year J.C.E. Barker of the Hudson Mining Company and Louis Bergeron, et al., of the Dacotah Mines made large capital investments in the Neihart mines. The Hudson Mining Company constructed a smelter/concentrator, which operated until 1887 when much of Neihart began declining. The Dacotah Mines, located up Rock Creek, had been incorporated with 500,000 shares in 1882; 200,000 of the shares had been in treasury stock. The neighboring town of Montezuma, just established in August 1883, began selling lots for three dollars. Located on Carpenter creek near the mouth of Snow Creek, it was in the midst of the mines, but off the travel route that favored Neihart with the railroad.

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[77]Neihart Herald Souvenir. Thanksgiving Number, 1895. reprinted by Wagon Box Publishing (The Meagher County News), White Sulphur Springs (n.d.), p. 5.

Before Neihart experienced its peak of mining activity, its civic leaders in conjunction with businessmen from White Sulphur Springs coordinated the construction of a trail connecting the two communities. In June of 1882, White Sulphur investors employed M.L. Sohmers to develop this trail from Sheep Creek to Neihart. The venture most likely was designed to siphon money from the mines into the White Sulphur economy, rather than letting it go north to Fort Benton or the adolescent community Great Falls. These same businessmen, for $1,100, later contracted James Brewer to build a wagon road from the Smith River to the head of O'Brien Creek. Neihart men worked from Neihart up O'Brien Creek to meet him. James Chamberlain had the dubious honor of bringing the first team and wagon over the mountain range into Neihart from White Sulphur Springs. Chamberlain was a partner in the Montana Belle and Minnehaha mines. By the summer of 1883, a wagon road opened connecting Belt Park to Neihart via Harley Creek. The Harley Creek road provided better communication and trade between the mining camp and the early agricultural community.[78]

Early in its formative years, Neihart was blessed by the presence of religion in camp. In August 1882 Reverend W.W. Van Orsdel, more commonly referred to as Brother Van, Superintendent of North Montana Mission of Methodist Episcopal Church, held the first religious service in Neihart. The first service was held in Joseph Hannah's log cabin; attendance was not recorded. Not until 1892 did the Methodist episcopal congregation construct their church; when they did it was large enough to seat 250 people. The Roman Catholic congregation had no resident priest and used the Miners' Union Hall for their meetings. The Protestant Episcopal Church used the AOUW hall.[79]

Because men generally dominated the population in mining camps and towns in numbers, fraternal organizations tended to dominate political, economic, and social activities. Neihart definitely had its share of these societies. Some of the largest included the Belt Mountain Miners' Union (1890); Belt Mountain Lodge # 18, AOUW (1891); Banner Lodge #49, IOOF (1893); Local Assembly #864, Knights of Labor (1893); and the Neihart Fire Department, established in 1891 and reorganized in 1893. In order to prove their importance in the mining community, most of their efforts were spent attempting to guarantee fixed wages. The Miners' Union's primary objective was to establish daily wages for underground workers at $3.50, and for surface workers $3.00. The Knights Of Labor also were pushing to maintain a standard wage scale of $3.00. The other primary effort of the societies was the establishment and maintenance of sick and death benefits for miners and their families. The Belt Mountain Lodge, by 1895, had already provided three death benefits of $2,000 each.[80]

The Neihart Fire Department was probably the most visible and most colorful of all the fraternal organizations. They started as a bucket brigade, forming whenever the bell (actually a pot) that had been raised on Henry Wilson's stable was rung. In 1893, with the reorganization, came the establishment of an actual department with three companies: Hose #1, Hose #2, and Hook and Ladder. They constructed a hose house

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[78]Ibid.
[79]Ibid.
[80]Ibid.

with a new alarm and an adjacent bell tower, and purchased two hand hose carts and 1,000 feet of hose. An intense rivalry developed between the hose companies; they regularly held hose races, with the losing team supplying the winning company with a keg of beer.[81]

In the fall of 1892, the Neihart Water Company was established at an estimated cost of $40,000. Water came from O'Brien Creek, and the reservoir supplying the town was built 1.25 miles from the town. The three-acre reservoir was fenced to prevent stock use. The one million cubic foot supply (estimated) was piped to the town through a 12 inch cast iron main, 10,000 feet in length with a 300 foot fall, providing 150 psi at the lower end of Main Street. The water, other than for domestic use, supplied 25 street hydrants. The Herald presses also operated using a #2 Pelton water motor, utilizing a 3/8 inch stream with a head of 125 psi, which supplied the motor with 6-7 horsepower and 1,800 rpm.

The Neihart Electric Company was organized within the Water Company. Its powerhouse located at the lower end of Main Street, fed off the main with a two-inch stream that turned a #5 Pelton wheel, generating 118 horsepower. This in turn powered generators that lighted the town.

Unlike the milktoast newspapers operated by editors fed syndicated stories, the newspapers in Neihart promoted an obvious political bias. The Neihart Miner, established in December 1891, was the Democratic voice in the community. The Neihart Herald, established in 1890, expressed Republican sentiment. Because of the Herald's rabid support of free silver, its circulation did quite well.

As Neihart became more established, and attracted more families, the need for public education grew. In 1892 the community established a school, built by contractor Joseph Wagner. The building was a two-story four-room frame structure on a stone foundation, complete with a belfry tower. Professor E.E. Bryant served as the school's principal.[82]

Little has been done on the impact ethnicity had on Neihart's development. Stark and Langdon mention an influx of Michigan copper miners who moved into the area, some of whom established the Michigan Settlement on the Riceville Bench. They also tell of a large Finnish population, but their ethnicity did not appear to dictate their relations between themselves and others any more than in any other community.[83]

The presence of a small Chinese population fit in with national patterns of Chinese serving in service roles in mining communities (restaurants, laundries). No opium dens are reported to have existed in Neihart, nor were Chinese involved in reworking abandoned mines, as was done in Confederate Gulch. Still, for some reason, Neihart held an anti-Chinese meeting December 14,1885, creating a permanent organization

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[81]Ibid.
[82]Ibid., p. 15.
[83]Stark, L.B., and Jack L. Langdon, 1969 'It Was Hard to Stay Sober in Neihart,' *Old* West. Spring, 14-19.

which demanded that all Chinese in the district leave within ten days. The order was amended to allow Tom Gong and Lee Sing to remain until May 1, 1886, in order for them to get their property in order.[84]

Before it was through growing, Neihart boasted eighteen saloons, which drew most of their customers from holes in the ground throughout the Little Belts. At its peak Neihart had a population of over 4,000; if every resident visited the saloons that would be roughly one saloon for every 220 residents. Charles Mix, a local miner and namesake of Mixes (Mix's) Balcly, owned one of the drinking establishments. Entertainment was not limited to the drinking establishments; Neihart also supported the businesses of Georgia Day, the Halfway House madam, and Jenny, Nell, and Ann, prostitutes who stayed at the Blue Goose Hotel. Other, less memorable *soiled doves' were almost certain to have plied their trade in Neihart as well.[85]

After establishing the initial mines and attracting fellow miners to the area, early mine owners in the Montana district held a meeting to organize and standardize their mining regulations. This meeting, held June 18,1882, established six main tenets: 1) Aliens could not assume rights as a prospector, and citizenship questions would be resolved before a Notary Public in the camp; 2) Claim locators would apply United States' laws when measuring claim locations; 3) Persons feeling others' claims are larger than allowed should request a United States Surveyor inspect the claim, with the applicant defraying the cost; 4) Persons representing claims in the Montana Mining District be credited five dollars per day, to be counted toward the one hundred dollar assessment required by law; 5) Denunciation of shiftless scavengers attempting to prey upon the legitimate miners and claims, and welcome to honest prospectors; and 6) Boundaries of the Montana Mining District of Meagher County are as designated -- "Commencing at the top of divide between Dry Fork of Belt Creek, and Fly [Carpenter] Creek, thence ten miles in a Westerly direction to Keegan's Butte, thence ten miles in a Southerly direction following the divide to the breaks of Sheep Creek, thence ten miles in an Easterly direction to the headwaters of the South Fork of main Belt Creek, thence ten miles in a Northerly direction to place of beginning, the town of Neihart supposed to be the central point.[86] With these boundaries the Montana district absorbed many of the smaller districts around it, such as Harley Creek, Carpenter Creek, Snow Creek, Jericho, and Johannesberg. Jericho, based around the operations of the Mountain Chief mine, lasted from 1884 to 1887. The Hudson Mining Company out of Boston had constructed a smelter and concentrator in the Jericho area, but after investing $200,000 they realized their venture would not be profitable. J.C.E. Barker had served as superintendent of the Company's enterprise.[87]

Silver was the precious metal pursued by Neihart miners. In an effort to concentrate the ore at one mine up Snow Creek, the miners established a cyanide plant in the 1890s. Snow Creek, particularly the Benton Group, also had a high concentration of gold in

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[84]Wahlberg, Donna, 1989. So Be It. A History *of* the *Barker Mining* District. Great Falls: Licini Press., p. 192.
[85]Wolle, Muriel Sibell, 1963. Montana Pay Dirt. A Guide to the Mining Camps of the Treasure State. Denver: Sage Books., p. 332.
[86]Wahlberg, Donna, 1989. So Be It. A History of the Barker Mining District. Great Falls: Licini Press., p. 192.
[87]Ibid., p 191.

their ore. Their ore bodies yielded $140-200 gold per ton of ore, rich in comparison with the rest of the Montana district. This Group was profitable from 1892 until 1896.[88]

Zinc and lead, which occurred in most of the lodes, were mostly ignored until World War 1. At that point many of the old dumps were reworked to extract the metal deposits in the old dumps. In 1916 the Anaconda Copper Mining Company established an electrolytic zinc plant in Great Falls, allowing for the processing of zinc bearing ores. In 1927 East Helena developed a slag-fuming plant, which could process higher lead concentrations in the ore being sent from the Neihart mines.[89]

Rather than lead bodies in the ore deposits, the Harley Creek mines carried copper. Most of the mines in this drainage belonged to the Imperial Group (eight claims) or the Royal Group. The Granite Mining Company operated the Little Joe and Albina claims. Graveyard Gulch, feeding into Harley Creek to the south, contains, appropriately, a grave yard which was used roughly the same time the mines in the area were being developed. Children as well as adults were buried there, indicating a familial presence in the area.

Neihart prospered for less than a decade before other mines began drawing their population to their ore bodies. From 1887 to 1890 Neihart experienced its first population drain. In 1890 the outward migration turned around with the news that a railroad would be coming to Neihart from Great Falls. Montana Central, which later became a branch of the Great Northern, rejuvenated the flagging mining community. Neihart was incorporated in the summer of 1891; on November 15 the rail line was completed, with seven-year-old Mabel Brennan, daughter of one of the 'first family men' Richard Brennan, striking the ceremonial silver spike cast from Queen of the Hills ore. Brennan was an owner in the Rainbow and Colorado lodes on Carpenter Creek.[90] After the railroad arrived racial tension seemed to have heightened; at least it was more apparent in one incident. The railroad had employed a Mexican work crew, with whom local miners had found reason to disagree. As a result of the escalating tension the railroad transferred the Mexicans out of Neihart, replacing -them with a Japanese crew. Harlowton, on the Milwaukee line, also employed a Japanese crew in their roundhouse.[91]

The mining industry was not the only user of the railroad. The railroad also provided access to more social and cultural events. Starting in 1898 the Montana Central ran daily passenger trains between Neihart and Butte. One year later, as technology developed and use of the line proved stable, railroad crews straightened and regraded the Neihart line. Recognizing the potential isolation of the Neihart community, the railroad made two flat cars available to young adults to transport them to Saturday night dances in Monarch. Starting in 1902, the railroad also ran the "fish train," picking

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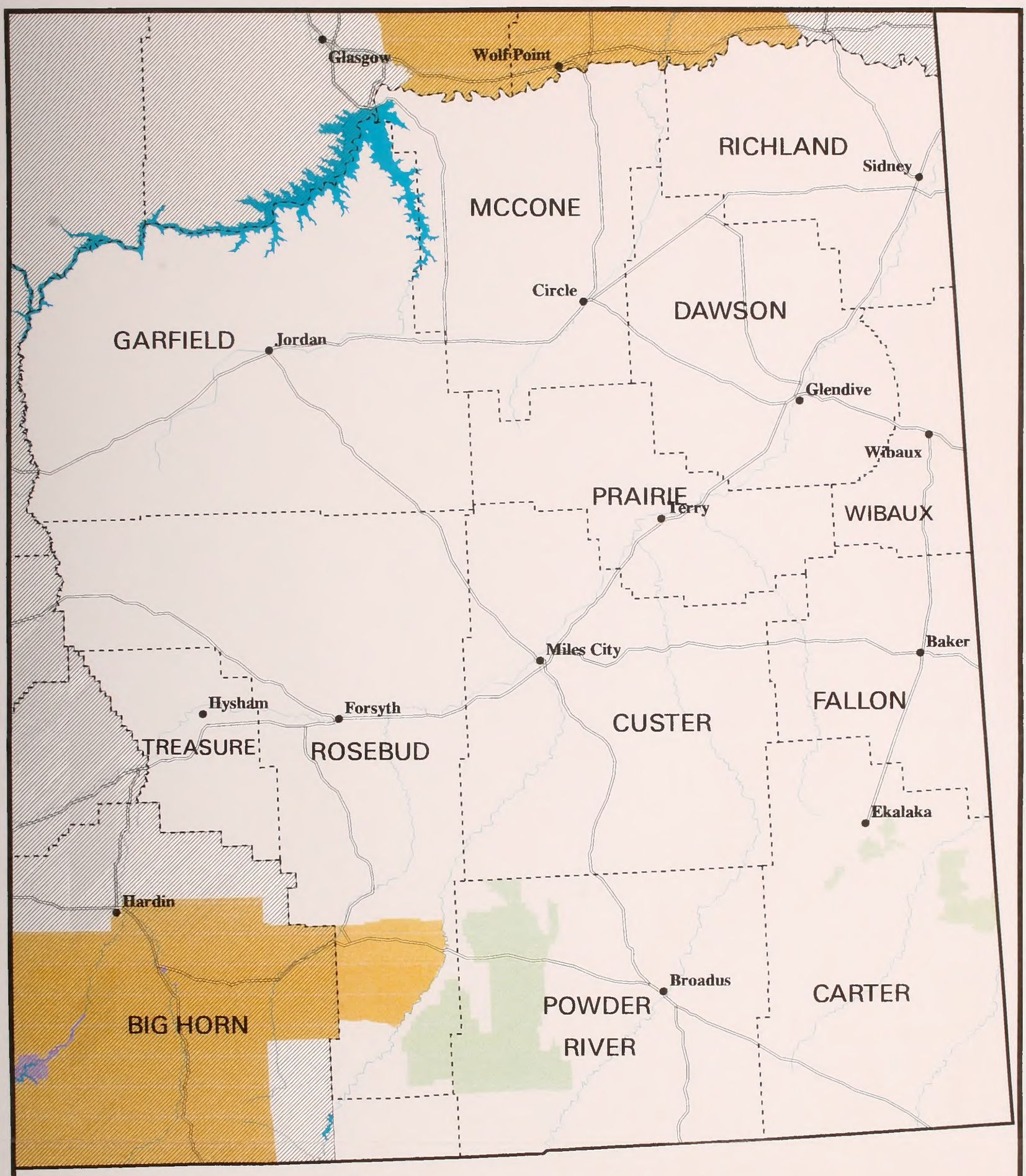
[88]Weed, Walter Henry, 1899. Geology in the Little Belt Mountains., p. 486.
[89]Robertson, Almon F., 1951 "Mines and Mineral Deposits (Except Fuels) Cascade County, Mont.' US Bureau of Mines Information Circular 7589., p. 8,9.
[90]Neihart Herald Souvenir. Thanksgiving Number, 1895. Reprinted by Wagon Box Publishing (The Meagher County News), White Sulphur Springs (n.d.), p. 3.
[91]Stark, L.B., and Jack L. Langdon, 1969 'It Was Hard to Stay Sober in Neihart,' *Old* West. Spring, 18.



Memoir 15 district - mining district boundary interpreted from MT Bureau of Mines & Geology Memoir No. 15, Plate 1; district numbering is from Sahinen (see NOTES).

New district - located and named by the Abandoned Mine Reclamation Bureau (AMRB), Montana Dept. of State Lands to facilitate mine inventory; new districts are not numbered.

Memoir 15 district boundary not used by the AMRB.

Stream

Highway

County Line

Outside of Region 2

National Forest

National Park

Indian Reservation

Scale of Miles

0 10 20 30

Albers Equal Area Projection, centered at 109.5 W, standard parallels at 46 and 48 N.

REGION 2

III - 18 - MAP 2

Montana State Library
Natural Resource Information System
99nris494-2 - April 19, 1999

GLACIER

Cut Bank

WEST BUTTE

GOLD BUTTE

TOOLE

Shelby

LIBERTY

HILL

Chester

Havre

PONDERA

Conrad

BEARPAW

TETON

Choteau

CHOUTEAU

Fort Benton

Great Falls

LEWIS AND CLARK

CASCADE

BIG BLACKFOOT

LINCOLN

WOLF CREEK

HELENA

BOULDER-STEMPLE

MARYSVILLE

FINN

YORK

SMITH RIVER

NEIHART

BARKER

NORTH

Memoir 15 district - mining district boundary interpreted from MT Bureau of Mines & Geology Memoir No. 15, Plate 1; district numbering is from Sahinen (see NOTES).

New district - located and named by the Abandoned Mine Reclamation Bureau (AMRB), Montana Dept. of State Lands to facilitate mine inventory

Memoir 15 district boundary not used by the AMRB.

Stream

Highway

County Line

Outside of Region 3

National Forest

National Park

Indian Reservation

Scale of Miles

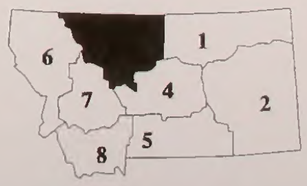
0 10 20 30

Albers Equal Area Projection, centered at 109.5 W, standard parallels at 46 and 48 N.

Montana State Library
Natural Resource Information System

99nris494-3 - April 19, 1999

Region 3



III - 18 - MAP 3

Great Falls
CASCADE
FERGUS
NORTH MOCASSIN
CONE BUTTE
WARM SPRINGS
PETROLEUM
Stanford
Lewistown
Winnett
BARKER
RUNNING WOLF
JUDITH
YOGO BASIN
NEIHART
WOLF CREEK
YORK
SMITH RIVER
JUDITH
MISSOURI RIVER
MAGPIE GULCH
HELLGATE
MAGPIE GULCH
SCRATCH GRAVEL HILLS
MEAGHER
Helena
BLUE CLOUD
HELENA
MONTANA CITY
CONFEDERATE GULCH
White Sulphur Springs
CASTLE MOUNTAINS
WHEATLAND
MUSSELSHELL
CLANCY
McCLELLAN
WINSTON
BEAVER
ALHAMBRA
COLORADO
BROAD-
Townsend
Harlowton
GOLDEN
Roundup
PARK
DEEP CREEK
LONE MOUNTAIN
MURRAY
MUSSELSHELL
Ryegate
H
AMAZON
IRON DIKE
ELKHORN
Boulder
WATER
VALLEY
RADERSBURG
BOULDER
BIG TIMBER CANYON

Scale of Miles
0 10 20 30

Albers Equal Area Projection,
centered at 109.5 W,
standard parallels at 46 and 48 N.

Montana State Library
Natural Resource
Information System
99nris494-4 - April 19, 1999

Memoir 15 district - mining district boundary interpreted from MT Bureau of Mines & Geology Memoir No. 15, Plate 1; district numbering is from Sahinen (see NOTES).

New district - located and named by the Abandoned Mine Reclamation Bureau (AMRB), Montana Dept. of State Lands to facilitate mine inventory; new districts are not numbered.

Memoir 15 district boundary not used by the AMRB.

Stream

Highway

County Line

Outside of Region 4

National Forest

National Park

Indian Reservation

Region 4

III - 52 - MAP 4

up anglers in Great Falls and dropping them off along Belt Creek as it proceeded up to Neihart. Fishermen would catch the train in the evening on its run back to Great Falls.[92]

With the arrival of the railroad the Neihart mines became more of a reflection of national trends. Events happening in other parts of the country began to have more of an effect in a shorter amount of time than prior to the railway's arrival. Economic ties with White Sulphur Springs were all but severed, and social events became more connected with the north flank of the mountains. Ore was transported north, but instead of hitting the river in Fort Benton it now stopped at the concentrators in Great Falls. If need be, it could be transported by rail to Butte or Helena from there. With this improved access the need for local smelters and concentrators declined. Larger, more efficient plants in Great Falls and East Helena could do the work more cost effectively than the local facilities. When the Diamond R concentrator, with a 300 ton daily capacity, burned in May 1921, it was not replaced. In 1928 the Silver Dyke Mining Company up Carpenter Creek closed its big mill. It no longer could justify running the plant, which could process 2,400 tons of ore in a 24-hour period. The closing of the mill coincided with the beginning of the Depression, which ushered in the collapse of the 1919-1929 boom accompanying W.A. Clark's interest in the Big Seven silver and lead mine.[93]

From 1935 to 1937 the Neihart mines experienced another brief boom. Zinc received slightly more attention than it had in the past, so some mines were reopened while others had their waste piles reworked. Producing mines included the Rochester, MU Florence, and Silver Dyke. By 1945, when Neihart's rail service was terminated, all the silver mines in Neihart were closed, excepting the Star Mill and Mine. It managed to operate until 1953.[94]

REGION 4

In the middle of the State is located region 4, which had moderate, mining activity mostly on its western fringe in the counties of Judith Basin and Meagher. In the County of Fergus were located the North Mocassin and the Warm Springs (Gilt Edge) districts, both which are dealt with here. In Judith Basin County, the only district not discussed here is the Running Wolf district, because as Dale Gray put it in his work for the AMRB in 1994, "Just as Placering was insignificant in the Running Wolf district, lode mines failed to produce much either." Several districts in Meagher County have not left as large a historical legacy as those covered here. They are Murray, Deep Creek, and Smith River. These three districts are located on the east side of the Big Belt Mountains, and were overshadowed by the districts located just over the ridge in Broadwater County.

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[92]Kennedy, Ethel Castner, and Eva Lessell Stober, 1979. Belt Valley History, 1877-1979. Great Falls: Advanced Litho Printing., p. 90-1.

[93]Wolle, Muriel Sibell, 1963. *Montana Pay Dirt. A Guide to the Mining Camps of the Treasure State.* Denver: Sage Books., p. 334.

[94]Stark, L.B., and Jack L. Langdon, 1969 'It Was Hard to Stay Sober in Neihart,' *Old* West. Spring, 19.

Judith Mountains (Warm Springs) 1880s to the Recent Past (HRA)

Prospectors Joe Anderson and David Jones first discovered gold in the Judith Mountains in May of 1880. Shortly after this, J. R. Kemper located gold at the Montana lode that along with the Oro Cache Lode, Oro Cache extension, mill site, and Holter placer became known as the Maginnis mine properties. Although Kemper soon abandoned the claim to continue his search for richer deposits, the claim was re-staked by Barney Hill and John Burke who dug a 15-foot deep pit that produced assays of $769 per ton in gold.[95]

A few miles east of their claim was the headquarters for the famous DHS ranch, owned at that time by Andrew J. Davis, Samuel T. Hauser and managed by Granville Stuart. "The cynical and hard nosed Hauser during the 1860s and 1870s wielded greater business and political power than any other man in Montana. He manipulated banks, railroads, livestock ventures with effortless aplomb".[96] His power and wealth, even though eclipsed by William A. Clark and Marcus Daly, continued through the 1880s and 1890s. Davis and Hauser were also partners in the fabulously productive Parrot mine in Butte. By 1881 the Parrot also operated a smelter and was becoming a leader in mining technology. During the same year Davis sold the Lexington mine in Butte for $1,000,000 to a French firm keeping a 1/8 interest.[97]

The discovery of gold in the Judith Mountains came relatively late in the history of the development of Montana, almost twenty years after the gold rush in southwest Montana. In 1880 placer gold was found in Alpine Gulch near the town of Maiden. By this time ranchers were settling central Montana and Lewistown was beginning to be a center of trade. Fergus County was established in 1886 with Lewistown being the county seat.[98]

Under the urging of the local ranchers, Fort Maginnis was established in 1880. One of the primary reasons for wanting the military was to bring cattle rustling under control. However, in 1884 the ranchers decided to take the law into their own hands and hanged or shot from fifteen to eighteen cattle and horse thieves.[99]

The first stamp mill was built in 1882 at the Collar Mine, about two miles from Maiden. It operated only for a short time before going broke. The following year the Maginnis Mine went into production and a stamp mill was constructed. Within a few years several mines with mills were operating, the Spotted Horse mine being the largest producer. With the introduction of the cyanide process in 1893 the extraction of gold

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[95]Leeson, M. A., 1885 History of Montana 1739-1885: Warner, Beers & Co., Chicago, Ill.

[96]Malone, Michael P., 1981 The Battle for Butte Mining and Politics on the Northern Frontier., 1864-1966. University of Washington Press, Seattle.

[97]Ibid

[98]Cheney, Roberta Carkeek, 1983 Names on the Faces of Montana: The Story of Montana's Place Names. Mountain Press Publishing Co., Missoula.

[99]Van West, Carroll, 1986 A Traveler's Companion to Montana history. A Montana Historical Society Guide. Montana Historical Society Press, Helena.

from low-grade ores became feasible and allowed the Gilt Edge Mine to become a major producer. Other mines soon adopted this process, and mining flourished.[100]

The railroad did not reach Lewistown until the spring of 1904. Without a nearby railroad, transportation of ore and concentrates for smelting in East Helena and other smelters was a major expense.

As the mines became deeper the character of the ores changed. Milling methods that were once successful did not work as well. Higher costs of processing the ores and the exhaustion of the higher-grade ores caused most of the mines to suspend operation by the 1920s. In 1933 the price of gold increased resulting in a resumption of some gold mining. Government order L-208 in 1943 stopped all gold mining during the war years with only limited mining resuming after the war.[101]

Soon after gold was discovered in 1880 the town of Maiden was established. It is located in the western portion of the Warm Spring Creek - Gilt Edge mining district immediately west of the Maginnis Mine and Mill. "Pike" Landusky and Joe Hamilton built a log cabin, in the town site the first building, in June 1881. Landusky in 1893 discovered gold in the Little Rocky Mountains and established the town of Landusky. Maiden grew to around 1200 people during the 1880s. In February 1882 a post office was established. The town had a general merchandise store, several saloons and grocery stores, barber shop, bakery, shoe shop, two hotels, dry goods store, hardware store, photo studio, blacksmith shop, roller skating rink, and a newspaper the "Mineral Argus". As the years passed the mines began to shut down and the town's population dwindled. In 1905 Maiden was virtually destroyed by fire and was never to be rebuilt.[102]

Hauser's interests in central Montana spread from that of cattle raising to gold mining after he heard of Hill's and Burke's strike at the Montana Lode. He and his friend Anton Holter bought the Montana Lode and Oro Cache Lode for $15,000. Holter owned several businesses in Helena, as well as the Elkhorn Mining Company. The partners formed the Maginnis Mining Company to work the claims.[103] They set up a two-stamp oscillating mill in 1882.[104] Milling and mining expenses amounted to $4.06 per ton. Since only about two thirds of the gold was being recovered, the mill was shut down with the intention of introducing amalgamating pans in the spring.[105] Instead of just adding pans in the spring of 1884 two wealthy businessmen decided on more elaborate plans for mining in the Judith Mountains. They filed for articles of incorporation and issued capital stock totaling $500,000, the 100,000 shares selling for five dollars a share. Hauser and Holter set up the corporate headquarters in Helena.[106]

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[100]Robertson, Almon F., 1950 Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544.
[101]Ibid
[102]Wolle, Muriel Sibell, 1963 Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver.
[103]Leeson, M. A., 1885. History of Montana 1739-1885: Warner, Beers & Co., Chicago, Ill., p.
[104]Engineering and Mining Journal November 25, 1882:285
[105]Engineering and Mining Journal November 24, 1883:330.
[106]Ibid

At this time, the Maginnis Mine was the only mine being developed in the Judith's.[107] They abandoned the two-stamp mill and in July ordered a double oscillating Huntington Mill from Fraser and Chalmers in Chicago, with a twenty ton a day capacity. Concentrators, amalgamators, and a 50 horsepower steam engine were also added. The cost of the machinery was about $20,000.[108] The intention was to use the Huntington Hill instead of a stamp mill. It is assumed that the 10-stamp mill located at the site was installed along with the Huntington Mill. A 6 x 6 inch flume several miles long brought water to run the mill.[109]

By the time the mill was set up and the flume was constructed several hundred thousand dollars had been spent.[110] The new mill started up in December of 1884.[111] The Maginnis Mining Company also operated the Black Bull (i.e., Globe) and P.K. Mines.[112]

On June 3, 1887 the Maginnis Mining Company received Mineral Patent No. 12134 for the Oro Cache lode and Mill site properties. Also on June 3, 1887 they received Mineral Patent No. 12135 for the Montana lode. In that year the mine had a depth of about 450 ft and a new hoisting works was ordered. In 1887 the Maginnis Mining Company purchased two adjoining properties [Oro Cache extension and probably the Holter Placer].[113] The Maginnis properties were enjoying the height of their prosperity from 1886 to 1896 according to A.V. Corry. This may not be entirely accurate. At a Maginnis Mining Company stockholders meeting in 1889 it was proposed that the properties be sold since it had an indebtedness of $202,123.99.[114] Part of this indebtedness could have been due to having purchased the adjacent Spotted Horse Mine where they were losing a great deal of money. They had spent $80,000 on the Spotted Horse Mill and $20,000 on additions to it.[115]

A 1901 edition of the newspaper Fergus County Argus states the Maginnis Mill was shut down in 1887. At which time over $20,000 worth of amalgam was stolen from the mill and chunks of ore running $4.00 to the pound were stolen from the mine. The newspaper reported "The robbing of the mine of rich gold-bearing ore was so common that it became the joke of the town [Maiden]."[116]

In 1891 W. H. Burgess was preparing to start up the old Maginnis Mill.[117] A press release in the 1893 Helena Independent reported a strike of good free milling gold at the

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[107]Ibid
[108]Ibid
[109]Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report., p. 599.
[110] Ibid
[111]Engineering and Mining Journal May 2, 1885: 304
[112]Corry, A. V., 1933. Some Gold Deposits of Broadwater, Beaverhead, Phillips, and Fergus Counties, Montana. Montana Bureau of Mines and Geology, Memoir 10., p.
[113]Ibid., p. 37.
[114]Engineering and Mining Journal June 8, 1889: p. 529 & October 12, 1889: p. 323.
[115]Ibid., July 19, 1902:395
[116]Fergus County Argus, 1901. Pictoral Edition. Fergus County Argus, Lewistown, Montana. p. 17.
[117]Hogan, Joseph and Oliver Jacob, 1891. Third Annual Report of the Inspector of Mines of Montana for fiscal Year 1891; Journal Publishing Co., Helena.

Maginnis Mine. Curiously, the same article stated that the mine had been idle for ten years.[118] A few years later the mill and mine were shut down again in 1894.[119]

The South Shaft was sunk on the Montana claim near the divide before 1897. About 1500 tons of lead-silver ore averaging 60 ounces silver a ton was mined from this shaft and sent to the smelter at Wickes.[120]

In 1899 W. A. Strain of Portland, Oregon and Mr. Parks of the Boston and Montana smelter at Great Falls secured the property from Hauser and Holter. During July of that year they had twelve men at work repairing the mill with plans to add a cyanide circuit.[121] A. S. Wright & Co. in 1900 bonded the property (presumably from Strain and Parks) along with the property at the Spotted Horse Mine. The company purchased a large part of the machinery of the old Cumberland mill at Castle to be used in the mills at Maginnis, Whiskey Gulch and Spotted Horse.[122] The article does not state which machinery was used at which mill. As of 1901 A. S. Wright and Co. as expended approximately $30,000 in improvements on the Maginnis property. The mills' working capacity had been increased, and a plant for working the ore by the cyanide process had been installed.[123] This venture must not have lasted very long because in 1902 P. B. Darrow and J. D. Wilcox were lessess of the Maginnis group.[124]

In the spring of 1904 G. M. Anderson, a leesee, struck high-grade ore in a winze, off the main tunnel and began shipping ore.[125] That summer Conrad-Stanford Co. of Great Falls and Helena purchased the mines and mill.[126]
C. E. and W. G. Conrad (for whom the town of Conrad -was named) were in the banking business with investments in various businesses. James Stanford, C. E. Conrad's brother-in-law, worked for the Conrads in the banking industry.[127] E. H. Crabtree of Lewistown was in charge of the works and operations at this location.[128]

In April 1905 the mine was shipping ore to the East Helena Smelter with runs of $300 a ton and better. There were hundreds of tons of mill ore on the dump waiting the starting of the remodeled mill. Workers installed a 60-horsepower gasoline driven hoist. Ralph Dorne had replaced Crabtree as manager by 1906.[129]

In 1909 the Maginnis group of mines was reported under lease of the Gold Reef Lease Mining Company. George Turnbull was general manager and had a work force of 15

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[118]Engineering and Mining Journal April 1, 1893
[119]Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report.
[120]Ibid.
[121]Engineering and Mining Journal July 8, 1889:48
[122]Ibid., November 30, 1900:529
[123]Fergus County Argus, 1901. Pictoral Edition. Fergus County Argus, Lewistown, Montana. p. 17.
[124]Mining and Scientific Press October 17, 1902: 260
[125]Ibid., April 16, 1904:274
[126]Ibid., August 13, 1904:112
[127]Cascade County Historical Society, 1981. Stone Age to Space Age in 100 years. Published by Cascade County Historical society, Great Falls, Montana.
[128]Mining and Scientific Press August 13, 1904:112
[129]Mining World, February 17, 1906:257-58

men. The Gold Reef Leasing Mining was formed in 1902, buying the nearby Gilt Edge Mine. The firm operated this mine successfully for a number of years.[130] The Maginnis Mines by 1910 had 6000 to 9000 ft of drifts with the longest tunnel being 1450 ft long. There was a new exploration shaft 225 ft deep.[131] The Gold Reef Mining Company remodeled the mill and in 1912 reported that by concentrating, amalgamating and cyaniding the ore about 95 percent of the values contained in the ores were recovered.[132] At this time the mill operation included a crusher, a Huntington Mill, a 10-stamp mill, six cyanide tanks of 280-ton capacity, Diester tables and agitators.[133] The treatment of ore was through stamps and Huntington Mill over tables. The crushed ore was classified, the slimes agitated and sand leached in cyanide solution.[134]

William Young in 1905 came to Montana from California and managed the Gilt Edge mine. Besides mining in California and Mexico he had for several years worked for the Ecquador, South America, geological survey.[135] In 1916 he leased the Maginnis mine property and employed a small work force sufficient to keep the mill busy about half time.[136]

"In 1912 a small but very high grade body of ore was found. It was worth over $250,000. Once the Gold Reaf Lease Mining Company worked the ore out, the partners took their share and gave up the lease. Young, who had served as the Gold Leaf Lease Mining Company's engineer, took up the lease and worked the mine until the mid-1920s."[137]

Some time before 1918 Holter regained one-quarter interest in the Maginnis property. The Dartmouth Land Company of Great Falls owned the other ¾ interest. During 1919 Young mined 150 tons of ore which yielded $7420 in gold, 875 ounces silver and 1008 lbs of lead. This made the mine the biggest producer in the district for the year.[138] It held that honor again in 1921 by producing 208 tons ore yielding $1883 in gold and 1387 ounces silver.[139] The mill and mine were closed down in 1922. After forty years of sporadic operation the mill closed permanently.[140]

During the 1930s George Wieglenda purchased the Maginnis properties and they remain in the Wieglanda family today.[141] In 1937 Wieglenda shipped crude ore to the

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[130]Walsh, William and Oren Williams, 1910 Biennial Report of Inspectors of Mines of the State of Montana for 1909-1910.
[131]Ibid., Plus Gerry, C. N., 1911- Gold, Silver Copper, Lead, and Zinc in Montana in 1918 (Mine 1929 Report): U.S. Geological Survey, Mineral Resources.
[132]Walsh, William and Oren Williams, 1910 Biennial Report of Inspectors of Mines of the State of Montana for 1909-1910.
[133]Bureau of Agriculture and Industry, 1911. Bureau of Agriculture and Industry, State of Montana 13th Report.
[134]Gerry, C. N., 1911- Gold, Silver Copper, Lead, and Zinc in Montana in 1918 (Mine 1929 Report): U.S. Geological Survey, Mineral Resources.
[135]Mining World April 8, 1905: 386
[136]Mining and Scientific Press August 5, 1916:218
[137]Hanley, Jerry (grandson of George Wieglenda), 1988 Review comments of the draft copy of this report.
[138]Gerry, C. N., 1920- Gold, Silver Copper, Lead, and Zinc in Montana in 1920 (Mine 1929 Report): U.S. Geological Survey, Mineral Resources. p. 208.
[139]Ibid., 1922:471
[140]Hanley, Jerry (grandson of George Wieglenda), 1987 Personal interview, December 4, Maiden, Montana.
[141]Ibid

East Helena smelter,[142] and then during the 1950s the tables and crusher were sold and in order to remove them part of the mill building was destroyed.[143] In 1954 three tons of ore shipped from the Maginnis mine yielded 14 ounces of gold and 31 ounces of silver.[144] This is probably the last shipment from the Maginnis property.

Robertson stated:

> The ore bodies were similar in character to those in the Cumberland and Spotted Horse mines. They occurred mainly in a fissure vein along the contact of Carboniferous limestones with the Gold Hill intrusive mass of syenite porphyry and as replacement bodies in the limestone. Numerous large cavities were encountered in the limestone; one of these was more than 150 feet deep.

The main mine was worked through two adits, one about 300 feet long and the other about 1,450 feet. A winze was sunk for 225 feet from the lower adit at a point about 800 feet from the portal. Several levels were driven from the winze. Up to 1910 about 9,000 feet had been developed.[145]

The Spotted Horse Mine, the most prolific producer in the Warm Spring Creek mining district, was located by Joe ("Skookum Joe") Anderson and David Jones in 1881. A year earlier they had (along with C. C. Snow and F. T. McPartlan) made the first gold discoveries in the Judith Mountains. The discovery was made in the placer gravel located in Alpine Gulch that is about two miles southwest of the Spotted Horse Mine. The Anderson and Jones team is given credit for the first lode discovery in the Judith Mountains and this became the War Eagle Mine.[146]

Lacking capital to develop the Spotted Horse claim, in 1883 Anderson and Jones borrowed money from an old acquaintance Perry W. "Bud" McAdow and Charles Dexter by putting the claim up for collateral. Dexter had been with Jones and Anderson when they located the Alpine claim. After attempts to turn the Spotted Horse into a paying mine failed, McAdow and Dexter foreclosed on the loan, gaining control of the Mine.[147] Another version of the transaction reported that McAdow and Dexter bought it from Anderson and Jones for $15,000.[148] In 1886 McAdow bought out Dexter gaining full control of the mine.[149]

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[142]Miller, T. H., 1938 Gold, Silver, Copper, Lead and Zinc in Montana in 1938 (Mine Report): U.S. Bureau of Mines, Mineral Resources.

[143]Hanley, Jerry (grandson of George Wieglenda), 1987 Personal interview, December 4, Maiden, Montana.

[144]Forrest, Richard A., 1971. Geology and mineral deposits of the Warm Springs-Giltedge District, Fergus County, Montana. Unpublished Master Thesis, Department of Geology, Montana College of Mineral Sciences and Technology, Butte.

[145]Robertson, Almon F. 1950. Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544.

[146]Robertson, Almon F. 1950. Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544.

[147]Van West, Carroll, 1986. A Traveler's Companion to Montana history. A Montana Historical Society Guide. Montana Historical Society Press, Helena.

[148]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver.

[149]Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report.

P. W. McAdow was one of the early pioneers in Montana. He arrived at Fort Owen in the Bitterroot valley in 1861 where he prospected for gold and operated sawmills during the gold rush in southwestern Montana. In 1863 McAdow moved to the Gallatin valley, started a ranch and established the territory's first gristmill. He left this operation to his brother and in 1877 went down the Yellowstone River to near where Billings is currently located and built a trading post. That winter he and a group of entrepreneurs laid out a town around the trading post calling it Coulson.[150]

When McAdow came to the Judith Mountains he was paralyzed and confined to a wheelchair. This handicap did not slow him down. Besides mining he opened a trading store a few miles down Warm Spring Creek from Maiden at Andersonville (named for Joe Anderson). At that time Benjamin Depte owned the post office, a steam driven sawmill and blacksmith shop in Andersonville.[151] McAdow eventually acquired the Depte sawmill.[152]

Not having sufficient money to develop the Spotted Horse mine, McAdow borrowed $4000 from his new wife, Clara Tomlinson McAdow, who was herself a shrewd and wealthy businesswoman.[153] In order to insure control over her investment she applied for the mineral patent on the property.[154]

A crude arrastre [sic] mill was set up and outcrop ore was processed yielding nearly three ounces of gold per ton, and leaving twice that amount in the tailings. At this time it was common practice to mill the ore to obtain payroll money, and then ship the tailings to a smelter.[155]

By the fall of 1886 the mine had struck a good body of ore in which " ... at times the rich bodies of soft, decomposed tellaride of gold were taken out with a spoon and packed in small sacks by the owner [McAdow]".[156] McAdow borrowed an additional $6000 and in the spring purchased the mill at the Collar Gulch mine from Eugene Smith, who had acquired the mill at a sheriff's sale for $7750 in 1885. This mill was moved from Collar Gulch and erected at the Spotted Horse. It was located in the area where the dam now stands. Leeson reported: "The mill contained a Fraser and Chalmers 10-stamp battery with 850-pound stamps, 12 pans, and 6 settles. A 1500 ft tramway connected the mine with the mill 400 ft below".[157] The Spotted Horse mine produced over $100,000 during

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[150]Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report. & Malone, Michael P., and Richard B. Roeder, 1975. Montana as it was: 1876. A Centennial Overview. Published by the Endowment and Research Foundation, Montana State University, Bozeman.

[151]Leeson, M. A., 1885. History of Montana 1739-1885: Warner, Beers & Co., Chicago, Ill., p.

[152]Van West, Carroll, 1986. A Traveler's Companion to Montana history. A Montana Historical Society Guide. Montana Historical Society Press, Helena.

[153]Ibid., p. 84

[154]GLO Records, n.d. Government Land Office Records, Bureau of Land Management, Billings, Montana.

[155]Hoffman, Larry, 1972. Exploration Program Spotted Horse. Prepared for Viking Exploration, Inc. Unpublished manuscript on file at Blue Range Engineering, Butte. p. 8.

[156]Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report. p. 588.

[157]Leeson, M. A., 1885. History of Montana 1739-1885: Warner, Beers & Co., Chicago, Ill., p. 597.

the first three months of operation.[158] The shaft was 225 ft deep by August of 1887 and the ore body was ten feet wide. Free milling ore assaying over five ounces of gold per ton was being milled and telluride ores running 40-80 ounces of gold per ton were shipped to Newark, New Jersey in ten-ton lots. McAdow stated that he was producing $1,000 per day at a cost of $125.[159]

An interesting side note is that a Montana constitutional convention was held that year (1889) in Helena and P. W. McAdow and a few other delegates tried without success to change the constitution to guarantee women the right to vote.[160] In 1889 the McAdows bonded the mine to a group of Helena investors. There are at least three versions of the identity of the Helena investors. One version cites Sam T. Hauser and Anton Holter as the investors.[161] In another version the Jay Gould Mining Company was cited as the mine owner.[162] In another version the mine was sold first to Holter and Hauser and then repossessed and sold to the Jay Gould Mining Company.[163] Since, Holter, Hauser and Gould were long-time friends and business partners, it is likely that the three of them bonded to the McAdows $500,000 to purchase the mine under the title of the Gould Mining Company. Jay Gould, a Union Pacific Railroad executive and financier, also owned the Jay Gould mine near Helena and operated that mine under the name of the Jay Gould Mining Company.[164]

Hauser and Holter had already purchased the adjacent Maginnis mine properties in 1883, which had not been a financial success. Evidently, they must have thought that the Spotted Horse was so fabulously rich that even they could make the mine a producer. They spent $80,000 on a new mill and $20,000 on other improvements at the mine.[165] McAdow repossessed the mine in 1891. At that time a two-compartment shaft was sunk to the depth of 260 ft and timbered with 8 x 8-inch timbers. Three levels have been driven from it and connections made. The air in the lower level was not good. In all other parts of the mine it was good. In the levels and stopes, where timbers are used, sets were put in. The system of timbering was much better than the timbering done previous. In some of the old workings, especially, where the chute of ore was large, stulls were used instead of sets. Much of this work had to be gone over and re-timbered.

A Knowles sinking pump, bucket, 7-8 inch rope and small engine were used at this time. Twenty men were at work. A twenty stamp mill was kept going constantly on

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[158]Van West, Carroll, 1986. A Traveler's Companion to Montana history. A Montana Historical Society Guide. Montana Historical Society Press, Helena. & Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report.

[159]Hoffman, Larry, 1972. Exploration Program Spotted Horse. Prepared for Viking Exploration, Inc. Unpublished manuscript on file at Blue Range Engineering, Butte., p. 8.

[160]Malone, Michael P., and Richard B. Roeder, 1975 Montana as it was: 1876. A Centennial Overview. Published by the Endowment and Research Foundation, Montana State University, Bozeman, p. 202.

[161]McAdow, P. W., 1901. P. W. McAdow, Millionaire Miner. The Fergus County Argus: A Pictorial edition, Lewistown, Montana.

[162]Weed, W. H. and L. V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report.

[163]Fergus County Argus, 1901. Pictoral Edition. Fergus County Argus, Lewistown, Montana.

[164]Malone, Michael P., 1981. The Battle for Butte Mining and Politics on the Northern Frontier., 1864-1966. University of Washington Press, Seattle. & Cheney, Roberta Carkeek, 1983. Names on the Faces of Montana: The Story of Montana's Place Names. Mountain Press Publishing Co., Missoula.

[165]Engineering and Mining Journal July 19, 1902: 95

the ore taken out.[166] Water to the mill was pumped from the head of Collar Creek Gulch, a lift of 300 ft and a distance of two miles. The remains of the pump station dam are still found in Collar Gulch.[167]

By November, McAdow had turned the mine back into the fabulous producer it was widely toughed as being. The mine had 200 men employed, with a payroll of $23,000 per month. It was producing over 5000 ounces of gold per month from the Spotted Horse Mill and the mill at the Maginnis Mine properties. Another 1500 ounces of gold per month was produced from the ore that was shipped for smelting.[168] Since Hauser and Holter had given the mine a bad name, McAdow displayed a 290-pound gold bar from the mine in Helena. Gold from the mine formed the base of the Montana statue at the 1893 World Exposition. McAdow also cast and displayed two statues of his own [one of which was of actress Ada Rehan].[169]

After extracting another million or so dollars in gold from the mine McAdow sold the mine for the last time in the winter of 1893 to the Double Eagle Gold Mining Company, composed of Chicago investors.[170] They worked the mine for a year and a half striking a very rich pocket of ore in 1894, which they sent to the Omaha Smelter.[171] That year manager, John W. Provard stole a large sum of money (probably in the form of gold) from the Double Eagle Mining Company and left the United States to avoid prosecution. The company never recovered from the loss and in 1895 the mine was sold at a sheriff's sale for $15,000, which was the face value of attachments on the property.[172] A press release concerning the sale regarded it as part of a scheme to be followed by reorganization.[173] Apparently, the reorganization plans did not materialize. The Bank of Fergus County bought the mine and sold it to J. L. Bright of Columbus, Ohio and Albert L. Losinger, of Maiden, Montana, with the former owning three-fourths interest. Along with the Spotted Horse properties they acquired the Double Eagle Gold Mining Company's rights to the adjacent Kentucky Favorite claims. The mine was bonded for $30,000.[174]

The Double Eagle Company put very little money back into the mill and hoisting plant, leaving it in poor condition.[175] By December of 1896 the 20-man work force had taken out about 1000 tons of ore. The ore was treated in the old 20-stamp mill, in which the free gold was extracted. Copper plates that were found to work as well as the pans replaced the pans of the mill. The exceptionally high-grade ore located in the shoots of

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[166]Hogan, Joseph and Oliver Jacob, 1891. Third Annual Report of the Inspector of Mines of Montana for fiscal Year 1891; Journal Publishing Co., Helena.

[167]Hanley, Jerry (grandson of George Wieglenda), 1988 Review comments of the draft copy of this report.

[168]Hoffman, Larry, 1972. Exploration Program Spotted Horse. Prepared for Viking Exploration, Inc. Unpublished manuscript on file at Blue Range Engineering, Butte..p. 8-9.

[169] Ibid & Miller, Don C., 1974 Ghost Towns of Montana. Pruett Publishing Co., Boulder, CO.

[170]Van West, Carroll, 1986. A Traveler's Companion to Montana history. A Montana Historical Society Guide. Montana Historical Society Press, Helena.

[171]Weed, W. H. and L. V. Pirsson, 1898 Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report.

[172]Fergus County Argus, 1901. Pictoral Edition. Fergus County Argus, Lewistown, Montana.

[173]Engineering and Mining Journal, June 1, 1895:518.

[174]Engineering and Mining Journal October 17, 1896:372

[175]Weed, W. H. and L. V. Pirsson, 1898 Geology and Mineral Resources of the Judith Mountains of Montana. U.S. Geological Survey, 18th Annual Report.

ore on the second and third levels was shipped to the Montana Smelting and Refining Company of Great Falls. The approximately 2500 tons of old tailings were worked in a small 40 ton per day cyanide plant with an extraction of 95 per cent (an average of $11 per ton) being made.[176]

In 1896 the Kentucky Favorite mine was connected to the Spotted Horse shaft by a drift run in a northwesterly direction. The drift started from the second level at a depth of 125 ft.

By April of 1897 the costs of operating the mine were exceeding the returns and J. L. Bright was having a difficult time paying wages and other debts.[177] A strike of rich ore later that spring brought new life to the mine providing sufficient money to build a new cyanide plant.[178]

The property was sold in 1900 in a sheriff's sale and the Bank of Fergus County once again bought it. The bank in turn sold the mine to Johanna Gold Mining Co., of Salt Lake City, Utah.[179]

As the miners stopped out the upper ore bodies ' the mine deepened. In 1900 under the management of A. H. S. Bird, miners made a rich strike at the sixth level.[180] That year the A. S. Wright & Go. leased the mine, forming a company called the Central Montana Mines Company. In 1901, under the direction of Superintendent C. T. Durell (past manager of nearby Gilt Edge Mine), miners installed a small compressed air hoist at a winze on the seventh level and a new air compressor for drifting located on the eighth and ninth levels. The management also made numerous alterations and additions to the old 20-stamp mill. All ores except those of the highest grade (which were sent to the East Helena smelter) were run through the mill's new four Wilfley concentrating tables which were placed immediately below the stamp batteries and plates. The pulp then passed into the settling box where it was drained and then shoveled into tanks for cyanide treatment.[181]

On July 12, 1902 a fire of suspicious origin wiped out most of the mining plant and nearby buildings.[182] The fire all but ended the Central Montana mine Company activities at the mine. There were several press releases stating that the mine was about to reopen but this did not happen until 1905 when the Chicago-Montana Mining reopened the mine. Judge Nelson of Chicago acting as president and C. T. Durrell appointed general manager.[183] At some time after 1905 the Chicago-Montana Mining Company became the St. Paul-Montana Mining Company.

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[176] Ibid.
[177] Engineering and Mining Journal, April 10, 1897:363.
[178] Ibid., July 24, 1897: 107.
[179] Fergus County Argus, 1901. Pictoral Edition. Fergus County Argus, Lewistown, Montana.
[180] Engineering and Mining Journal May 26, 1900:629.
[181] Engineering and Mining Journal June 29, 1901: 885; August 3, 1901: 148; November 16, 1901:646; November 30, 1901:734.
[182] Engineering and Mining Journal July 19, 1902:95.
[183] Mining World April 8, 1905:386.

Around 1909 the Cumberland Gold Mining Company acquired the property. State Mine Inspector Walsh, reported the ore was conveyed by a gravity tram to the newly enlarged mill. The mineshaft was 400 feet in depth and equipment consisted of a steam plant. Cages being used in the operation had all safety appliances attached. The shaft and the workings of the mine had been repaired.[184]

In 1912 the property was owned [or at least there was an option to buy] by James Breen and was leased by and under the management of Ed Coolidge.[185] Coolidge and Bryant constructed the concrete-tailing dam, which is still located at the mine.[186] They operated the mine successfully until 1915 by scraping the walls of the old stopes.[187] In 1915 the mine had a depth of 585 ft and a cyanide plant with a 50 to 100 ton per day capacity. Evidently, James Breen was unable to pay for the mine because in 1916 the St. Paul Montana Mining Company again had control over the mine. The company withdrew its lease from Coolidge and Associates and operating the mine themselves for about one year and a half.[188] A new mill was built and milling grade ore was once again mined but the mill was not designed properly and would not recover the gold from the ore.[189]

In August of 1917 there were 40 men employed and the mine was producing $12,000 to $14,000 monthly.[190] The mine was shut down for a short time around 1919.[191]

Coolidge, Bryant and Associates worked the mine sporadically until 1926. George E. Wieglenda leased it in 1933 and made some small shipments in 1933 and 1935.[192] Around 1935 the mill was dismantled and moved to the North Moccasin Syndicate's property.[193] In 1940 Charles Lesley Ames and Donald W. Taylor of St. Paul, Minnesota served as trustees of the Spotted Horse and Kentucky Favorite properties.[194] In 1968 Larry Hoffman of Butte, Montana leased the property. He reopened the old workings and carried out mapping and sampling of the mine. Viking Exploration, owners of the mine, carried out exploratory work under the supervision of Hoffman from 1972 to 1974.

Forrest states that:

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[184]Walsh, William and Oren Williams, 1910. Biennial Report of Inspectors of Mines of the State of Montana for 1909-1910. P. 64.
[185]Mine and Engin ering World February 3, 1912:311.
[186]Hanley, Jerry (grandson of George Wieglenda), 1987. Personal interview, December 4, Maiden, Montana.
[187]Forrest, Richard A., 1971. Geology and mineral deposits of the Warm Springs-Giltedge District, Fergus County, Montana. Unpublished Master Thesis, Department of Geology, Montana College of Mineral Sciences and Technology, Butte.
[188]Ibid.
[189]Hoffman, Larry, 1972. Exploration Program Spotted Horse. Prepared for Viking Exploration, Inc. Unpublished manuscript on file at Blue Range Engineering, Butte. p. 10.
[190]Mining and Science Press, August 5, 1916:218.
[191]Ibid., August 25, 1917:286.
[192]Forrest, Richard A., 1971. Geology and mineral deposits of the Warm Springs-Giltedge District, Fergus County, Montana. Unpublished Master Thesis, Department of Geology, Montana College of Mineral Sciences and Technology, Butte.
[193]Robertson, Almon F., 1950. Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544.
[194]Trauerman, Carl J. and Waldron, Cecil R., 1940 Directory of Montana Mining Properties. Montana Bureau of Mines and Geology , Memoir 20.

"...approximately 76,000 tons of ore have been stoped from three re shoots over a vertical range of 600 feet. Figuring the average gold content at about 2 ounces per ton, this would be the equivalent of about $3 million at $20/ounce. Production figures from 1909 to 1935 inclusive are reported to be 16,277 ounces of gold, 14,925 ounces of silver, and 206 pounds of copper from 17 639 tons of ore, for a grade of approximately 0.926 ounce gold and 6.848 ounce silver per ton. This includes ore that was milled and shipped during that period. Smelter reports from the Anaconda smelter, Anaconda, Montana, show that 2,421 tons of ore shipped to them between 1909 and 1935 yielded 10,569 ounces of gold and 8,658 ounces of silver, for an average shipping grade of 4.37 ounces gold and 3.58 ounces silver per ton.[195]

Robertson relying primarily on the work of Corry (1933) writes:

... the ore at the Spotted Horse mine has been found in three geological environments - in a fissure vein along the contact between syenite porphyry and massive Carboniferous limestone; in replacement bodies along bedding planes in the limestone; and in replacement bodies in the porphyry. Numerous veinlets extend away from the main fissure and penetrate the country rock on each side. The ore bodies were irregular in form both laterally and vertically; they ranged in size from narrow stringers to bonanza bodies up to 80 feet in maximum width. The oxidized zone extended irregularly to below 400-foot level. Brecciated limestone or crushed and highly altered porphyry, calcite, chalcedonic silica, and fine-grained or earthy purple fluorite constitute the gangue in which gold occurred free and in the form of sylvanite and possibly other tellurides, along with some sulfide minerals.[196]

The Cumberland Mine was discovered in the 1880s by Peter Rosso but little work was done at the mine until after 1904. In 1903 a cyanide test of the ore showed 14-1/2 ounces of gold per ton from a 40-ton run. With these encouraging results, owners Oscar Stephens, R. M. Calkins and Peter Rosso began working the mine in earnest.[197] By 1905 they had dug a vertical shaft 200-ft deep and were reporting a large body of $25 per ton ore with small veins of $1000 to $18,000 per ton values.[198]

In 1906 ore averaging $20 per ton was being shipped for smelting.[199] The sudden death of Oscar Stephens in Colorado in 1907 shut the mine down.[200] The following year it was sold to Theodore L. Lammers and Company of Spokane, Washington, who formed

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[195]Forrest, Richard A., 1971. Geology and mineral deposits of the Warm Springs-Giltedge District, Fergus County, Montana. Unpublished Master Thesis, Department of Geology, Montana College of Mineral Sciences and Technology, Butte. p. 83.
[196]Robertson, Almon F., 1950. Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544. P. 19.
[197]Mining World, July 11, 1903:27; Mining World, January 6, 1904.
[198]Ibid., December 2, 1905:624.
[199]Ibid., March 3, 1906:313.
[200]Ibid., January 26, 1907:126.

the Cumberland Gold Mining Company with James Breen, general manager and superintendent in charge.[201] A mill was constructed using the latest improved equipment. It contained a crusher, rolls and Wilfley tables with a 100-ton cyanide circuit.[202] Twenty-eight tons of ore was sent to the Panhandle smelter in Idaho, which netted $7159.[203] By 1910 James Breen was the principal owner. There were 60 to 75 men employed and a shaft 250-ft deep. Miners dug a 900-ft long haulage tunnel in order to convey the ore to the mill.[204] Later in the year, six leaching tanks were added to the existing four, increasing the cyanide circuit capacity to around 250 tons per day. The mine was shut down after 1912 but was reopened again in 1916 by George Wieglenda, A. Sellars, Gene Nelson and Milo Skerro who leased it from the Cumberland mines syndicate.

Fire destroyed the mill in September 1948.[205] As of 1950 the Cumberland Mine Syndicate still owned the Cumberland. Trustees were Call. Fowler, D.B. Hoble and Margharite F. McClean, all of Lewistown, Montana. Some equipment was removed from the mill and used at the north Moccasin Mine Syndicate property, near Kendal, Montana.[206]

The Cumberland mine, like the nearby Maginnis Mine, did not consist of just one claim but a group of claims. Therefore, the mine is usually referred to as the Cumberland Group. The claims are the Cumberland, Survey No. 9154; Cumberland No. 2, Survey No. 9154; Buffalo, Survey No. 9154; North Kentucky, Survey No. 9154; and North Pole (i.e., Survey No. 9154).[207]

Robertson states:

> Ore in the Cumberland mine occurred in a vein along the contact of Madison limestone and the eastern edge of the Gold Hill syenite porphyry and in a large replacement body mainly in the porphyry near the contact. The gold occurred free and as sylvanite; it usually was associated with the fluorite. The gangue in the vein consisted of brecciated limestone, crushed and highly altered porphyry, calcite, chalcedonic silica, and fine-grained purple fluorite. The large oval replacement deposit, consisting of highly altered porphyry and brecciated limestone traversed by a network of small fractures, was the principal source of the ore mined. The gold in this replacement deposit occurred free or in the form of tellurides along with minor sulfides associated with crystalline masses and earthy lumps of pink and purple fluorite.

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[201]Mining and Scientific Press May 23, 1908:688

[202]Walsh, William and Oren Williams, 1910. Biennial Report of Inspectors of Mines of the State of Montana for 1909-1910.

[203]Mining and Scientific Press, March 13, 1909:369.

[204]Walsh, William and Oren Williams, 1910. Biennial Report of Inspectors of Mines of the State of Montana for 1909-1910.

[205]Robertson, Almon F., 1950. Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544.

[206]Hanley, Jerry (grandson of George Wieglenda), 1988. Review comments of the draft copy of this report.

[207]Forrest, Richard A., 1971. Geology and mineral deposits of the Warm Springs-Giltedge District, Fergus County, Montana. Unpublished Master Thesis, Department of Geology, Montana College of Mineral Sciences and Technology, Butte. p. 73.

Ore similar to that found at the Cumberland was mined along the porphyry-limestone contact on the 585-foot level of the Spotted Horse mine, approximately half a mile to the southwest.[208]

Moccasin Mountains (North Moccasin) 1890s to Recent Past

Mining activity came late to the North Moccasin Mountains and it turned out to be one of the last major gold strikes in Montana. Although rich gold deposits were discovered in the nearby Judith Mountains in 1880, it would be more than another decade before the first major gold deposits were located in the North Moccasins. There had been some placer mining claims staked in the early 1880s, mostly in Iron Gulch on the west side of the North Moccasins by John Brooks, the Buchannan brothers, W.C. Draper and W.C. Waldorf. Other placer claims were made in McClure Gulch, Red Rock Creek and Plum Creek but a lack of water for sluicing and insufficient "pay dirt" led to an abandonment of the workings after only modest success, estimated at from $10,000 to $50,000 worth of gold.[209]

Lode claims were made on the east slopes of the North Moccasin Mountains early in the 1890s but since the gold was not free milling and could not be extracted by amalgamation, little development occurred. The arrival of Harry T. Kendall into the area early in 1900 led to a rapid and highly successful development of the lode mines which were concentrated in a two mile-long, north to south trending belt on the east side of the North Moccasins. Kendall had previously built and run a cyanide process mill at the Spotted Horse mine in the Judith Mountains. His success there convinced him that the ores in the North Moccasins were ideally suited for the new process. In the spring of 1900 he bought the Leaking and Klondike claims from Charles Allen and then built a 50 tons-per-day cyanide mill at the site of what would become the Kendall mine. By the end of the year the mine had produced $2400 worth of gold bricks.[210]

With such obvious potential, it was inevitable the mine and the North Moccasin area would attract a great deal of attention from other mining interests. Kendall was approached by the Finch and Campbell company of Coeur d'Alene, Idaho who offered him $460,000, plus a ten percent interest in the operation, for his mine. Kendall accepted the offer but stayed on to help run the operation (later he would move to Santa Barbara, California where he owned and operated a Hotel until he died in 1914). The new company (reorganized in June of 1901 as the Kendall Gold Mining Company) tore down the original mill and built a new 500 ton-a-day mill at the same location. Using water from the Big Warm Springs located about six miles south of the mine, an

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[208]Robertson, Almon F., 1950. Mines and mineral deposits (except fuels), Fergus County, Montana. U. S. Bureau of Mines Information Circular 7544. p. 21.

[209]Blixt, John E., 1933. Geology and Gold Deposits of the North Moccasin Mountains: Fergus County, Montana. Montana Bureau of Mines and Geology Memoir No.8. Montana School of Mines, Butte.

[210]Foster, John R. and Glenn C. Morton, 1974. Kendall: Twentieth Century Ghost Town. Montana the Magazine of Western History 24(2):68-85.

electric plant was constructed to furnish power to the mines, mills and town of Kendall which was growing with the mines.[211]

The mine was operated by the Kendall Cold Mining Company continuously until 1912 when It was taken over in 1915 by the Barnes-King Development Company who then purchased the mine, mill and 400-horse power hydroelectric plant on Warm Spring Creek. The Kendall mine, however, was shut down in 1913 but by that time it had produced an estimated 700,000 tons of ore and paid $1,450,000 in dividends to investors. A. B. Fox and S. D. Whipple leased the property and continued to operate the mine and mill on a reduced scale until 1921. In 1935 the North Moccasin Mines Syndicate leased the property and in 1940 they purchased it outright although little actual mining was done on the property.[212]

The mine started as an open cut on top of the largest ore body in the North Moccasin district in 1905 and 1906. An inclined shaft was sunk followed by a 600-foot vertical shaft Subsequently a large open pit was developed with ore being extracted from the bottom of the pit through the underground workings. The ore was processed in the mill's cyanide tanks that had a capacity of 170 dry tons of ore. The ore was leached for seven days with an extraction rate of about 87 Percent. Some 800,000 tons of tailings were left by the operation when the mill shut down in 1922. During its profitable life span the Kendall mine produced an estimated 450,000 ounces of gold and 50,000 ounces of silver.[213]

Half a mile to the northeast from the Kendall mine, was the other major North Moccasin mining operation, the Barnes-King mine. Gold was first discovered at the location in 1893 but was not developed until 1901. John P. Barnes bought the original claim even though he knew the claim had been salted. Barnes'acumen was confined when the lode ultimately proved to be as rich as the Kendall's. In 1901 a 100-ton mill and cyanide plant were built at the site. During that same year the various claims were consolidated under the control of E. W. King, the superintendent of the Gilt Edge mine in the Judith Mountains, who formed the Barnes-King Mining Company. By 1905 the company owned 22 patented claims, had doubled the capacity of the miff and had developed an operation which netted $25,000 a month in profits. In May of 1905 the company reported assets of $1,125,000 and no liabilities.[214]

In March of 1907 the company was reorganized as the Barnes-King Development Company by a group of Butte and New York capitalists who paid $1,200,000 for the property. After a shaky start the new company continued the mine's success and reportedly paid over $500,000 to stockholders in the period between 1907 and 1909.

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[211]Robertson, Almon F., 1950. Mines and Mineral Deposits (Except Fuels) Fergus county, Mont. United States Bureau of Mines Information Circular 7544. United States Department of the Interior, Washington, D.C.

[212]Montana State Bureau of Mines and Metallurgy, 1919. Directory: Montana Metal and Coal Mines. University of Montana Bulletin No. 2,. State School of Mines, Butte.

[213]Krohn, Douglas H. and Margaret Mlynarczyk Weist, 1977. Principal Information of Montana Mines. Montana Bureau of Mines and Geology Special Publication 75. Montana College of Mineral Science and Technology, Butte.

[214]Blixt, John E., 1933. Geology and Gold Deposits of the North Moccasin Mountains: Fergus County, Montana. Montana Bureau of Mines and Geology Memoir No.8. Montana School of Mines, Butte.

From 1907 to 1910 the mine was reported to have produced an additional $828,110 in gold.[215]

The mine was worked at flat from open pits and shallow adits near the surface. By 1905 an inclined shaft was driven into the ore body and then a 280-foot vertical shaft was sunk, and from this shaft, at the 200-foot level, a 3700-foot long adit (known as the Horse tunnel) was driven northeast to the Horseshoe and Muleshoe claims located near the mouth of Little Dog Canyon. The Horseshoe group of mines consisted of open cuts and small stopes with the ore being trammed through the Horse tunnel. In 1935 the Horseshoe group was acquired by the North Moccasin Mines Syndicate which set up a cyanide mill near the Muleshoe open pit which had been moved from the old Spotted Horse mine in the Judith Mountains. Ore from the open pit was processed in seven circular tanks that could treat about 150 tons of ore a day.[216]

The ore mined was, like the Kendall mine ore body, not free milliing but the ore was easily treated by cyanidation. The ore was first roasted in an oil fired rotary roaster; it was then crushed by rollers set at 3/8 inch and finally run through the cyanide process. The process was quite efficient for that period with about a 90 percent recovery rate. Huge amounts of ore were treated as evidenced by the more than a million tons of tailings left by the operation.[217]

During the 1910s the mine was worked on a decreasing scale until it was shut down in 1920 although it still produced bullion valued at $2,167,000. Lessees then took over the mine but by 1921 all equipment was taken from the workings below 500 feet which were then abandoned. By the end of 1923 all mining operations in the district had ceased. In December of 1925 the Bames-King Development Company was legally dissolved and the company's properties were placed under the supervision of trustees.[218]

In 1935 J. H. McLean, George Wieglenda, Frank Bryant and Tom Pittman formed the North Moccasin Mines Syndicate that acquired leases on many of the Barnes-King claims in the Kendall area from the trustees of the defunct company. A modest amount of mining was undertaken on the old workings and it was during this period that the cyanide mill was brought in and set up near the Muleshoe open pit. In 1940 Mrs. J. H. McLean bought out the other partners and purchased all the properties owned by the Barnes-King Development Company that also included the Kendall, and North Moccasin mines, thus finally bringing all the mines on the hill under single ownership. Mining operations were short-lived, however, for in 1943 Government Order L-208 shut

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[215] Ibid.

[216] Robertson, Almon F., 1950. Mines and Mineral Deposits (Except Fuels) Fergus county, Mont. United States Bureau of Mines Information Circular 7544. United States Department of the Interior, Washington, D.C.

[217] Ibid.

[218] Blixt, John E., 1933. Geology and Gold Deposits of the North Moccasin Mountains: Fergus County, Montana. Montana Bureau of Mines and Geology Memoir No.8. Montana School of Mines, Butte.

down all nonessential gold mines, which included the Kendall area mines. Canyon Resources Corporation undertook no further mining until the current development.[219]

Although the Kendall and Barnes-King operations were the major producers of the North Moccasin district, they were not the only companies engaged in mining on the hillside above Kendall. A number of short-lived, small operations also attempted to exploit the rich ore bodies. One of these was the North Moccasin Gold Mining Company which acquired a group of six claims in 1908 adjacent to the West Side of the Bames-King group of claims. The claims had originally been discovered in 1898 and considerable development work had been done on the property before 1908, including the sinking of a 325-foot shaft. Only sporadic work was done of the property until 1912 when the claims were bought by the Barnes-King Development Company for $150,000. Work continued from the 400-foot level of the Bames-King mine and from the reopened North Moccasin shaft until 1920 when the company suspended operations. The property was initially leased to the North Moccasin Mines Syndicate in 1935 and then was purchased outright in 1940. When the operation was closed in 1922 it had produced 321,232 tons of ore which yielded 116,835 ounces of gold and 18,485 ounces of silver. Most of the $2,167,313 in bullion sold by the Bames-King Development Company during the period from 1911 to 1922 came from the North Moccasin mine.[220]

Located between the Kendall and Bames-King mines was another small mining property known as the Santiago. Owned by John A. Drake, the mine was a moderately successful, but short-lived, operation during the early 1900s. The six claims were located in 1898 and then developed over the next decade. In 1907 an electric tramway was built from the mine to the Kendall mill where the ore was processed. The following year the nine was sold to the North Moccasin Gold Mining Company but then in 1909 the shaft caved-in and work ceased at the mine. At this point the mine had produced 27,500 tons of ore which yielded $127,000 in gold bullion. The mine was reopened in 1912 and worked through the 400-foot level of the Bames-King mine. The next year the Santiago shaft was repair and ore was hoisted from three levels. The mine continued to operate until 1920 when it was turned over to lessees who ran it until 1923 when it closed permanently.[221]

The Golden Discovery mine, located just west of the Kendall pit and about 1500 feet from the Kendall shaft, was another small operation that saw only limited development work. The mine was opened by the Golden Discovery Gold Mining Company in 1909 and some additional development work was done in 1911, consisting of a two-compartment shaft 500 feet deep with. A 350-foot crosscut driven north on the 300-foot level. Although some good ore was found, no deposits large enough for commercial production were ever developed.[222]

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[219]Robertson, Almon F., 1950. Mines and Mineral Deposits (Except Fuels) Fergus county, Mont. United States Bureau of Mines Information Circular 7544. United States Department of the Interior, Washington, D.C.

[220]Ibid.

[221]Blixt, John E., 1933. Geology and Gold Deposits of the North Moccasin Mountains: Fergus County, Montana. Montana Bureau of Mines and Geology Memoir No.8. Montana School of Mines, Butte.

[222]Robertson, Almon F., 1950. Mines and Mineral Deposits (Except Fuels) Fergus county, Mont. United States Bureau of Mines Information Circular 7544. United States Department of the Interior, Washington, D.C.

The H and H claim was located in this same area but little is known about the operation. It was reported that in 1904 a 500-foot adit had been driven and good ore had been developed but there is no record of the mine ever going into production.

About a mile north of the Horseshoe group, and the northern-most mine in the North Moccasin district was the Abby mine. This small mine was first located during the district's early period and then development work was done on the property during the first decade of the twentieth century.

Additional development work was done in 1911 and 1914, consisting of a 200-foot shaft, a 600-foot adit and several hundred feet of drifts. Although over $90,000 was reported to have been spent on this property, no ore deposits were found large enough for commercial development and the mine has be idle ever since.[223]

The North Moccasin mining district's period of activity lasted for only about a decade shortly after the turn of the century but during this period it made Fergus County the foremost gold-producing county in Montana. Precise production figures for the district's total output are not known. It is estimated the district produced at least nine million and perhaps as high as 15 million dollars in gold and silver, most of which came from the mines on the mountainside above the town of Kendall.[224]

Gilt Edge Mid 1880s to Recent Past

In 1884-1885 Wilson, Anderson and Munson staked mining claims in the area that would become known as the Gilt-Edge mining area. They sold the claims to Collins and Armington who, in 1892, constructed a small, primative cyanide mill to process the low-grade ore. This mill was on the west edge of the town of Gilt Edge and about two-km from the mine. The Ammon-Strivers Mining Company bought the property in 1893. They employed Professor W. B. Potter of St. Louis, Missouri, as a consulting engineer. He had the mill rebuilt but even though this rebuilt mill was an improvement over the original one it still was not very efficient. However, it was the first cyanide mill in the United States capable of handling 100 tons of ore a day. In the summer of 1896 lien holders attached the property.[225]

The Great Northern Mining and Development Company purchased the property in 1897. They hired E. W. King as their mining superintendent and under his direction the mine became profitable. Part of this was due to the construction in 1899 of a new, modern mill adjacent to the main mine adit. This location near the mine greatly reduced the cost of hauling the ore. The Gold Reef Mining Company bought the property in 1902. The mill originally had the capacity to handle 150 tons of ore a day. The Gold Reef Mining Company increased the mill's capacity to 350 tons of ore per

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[223]Ibid.

[224]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver.

[225]Weed, W.H. and L.V. Pirsson, 1898. Geology and Mineral Resources of the Judith Mountains of Montana. United States Geological Survey, 18th Annual Report, Part 3, pp. 437-6169 18 plates and 25 figures.

day.[226] Coal was used to fire the ovens for roasting the ore. The Gold Reef Mining Company got the coal from a mine six km to the south. The mine was named the "Company" after the Gold Reef Mining Company.[227] Some of the ore could not be treated directly by the cyanide process and had to be roasted first. This ore was called "black" or "unoxidized" ore, whereas, the ore that did not need to be treated was called oxidized ore.

In 1909 J. H. Drake became the owner of the property. He leased it to the Gilt Edge Lease Mining Company that was owned by Caldwell Cooper, and Turnbull. Mining ceased in 1912. By this time there were over 2-1/2 miles of underground workings. Surface or strip mining of the mountainside also took place. During the winter, mining activity was underground and during the summer it was on the surface.[228]

In 1918, 8,200 tons of the tailings from the first mill were re-treated in a cyanide plant specially constructed for this purpose. This produced 528 ounces of gold and 74 ounces of silver.[229]

The property lay idle until 1940 and 1941 when the Newmont Mining Corp. made an examination of the accessible workings and conducted several hundred feet of exploratory work along with some core drilling.[230]

The town of Gilt Edge came into existence in 1885 as the result of the discovery of gold at the Gilt Edge Mine. However, nearby Fort Maginnis and the influx of homesteaders into the surrounding area added to its growth. When Fort Maginnis (built in 1880) was abandoned in 1890 several of the buildings were moved to Gilt Edge.[231]

In 1899 a plat of the townsite of Gilt Edge was surveyed and filed in the Fergus County Courthouse in Lewistown. Currently, the name of the town is spelled as one word - Giltedge. The lots measured 25 feet x 120 feet. Each full block had 28 lots. There were 43 blocks laid out.

Since the town of Gilt Edge depended almost entirely upon mining for revenue it waxed and waned along with the Gilt Edge mine. In 1901 Gilt Edge had a population of 350 people and was the distribution point for mail to post offices at Fort Maginnis, Roy, Fergus, Alpine, Edgewater, Maiden, Grass Range, Flatwillow, Musselshell, Baldwin, Milner and Junction.[232] By 1916, the town was almost entirely deserted.[233]

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[226]Walsh, William and William Oren, 1910. Report of Inspectors of Mines of the State of Montana for 1909-1910.
[227]Calvert, William R., 1909. Geology of the Lewistown Coal Field, Mont. United States Geological Survey Bulletin' 390.
[228]Walsh, William and William Oren, 1910. Report of Inspectors of Mines of the State of Montana for 1909-1910.
[229]Robertson, Almon F., 1950. Mines and Mineral Deposits (except fossil fuels) Fergus County, Mont. United States Department of Interior, Bureau of Mines. Information Circular 7544.
[230]Ibid.
[231]Deal, Babbie and Loretta McDonald (editor), 1976. History of Giltedge (no author given). In The Heritage book of the Original Fergus County Area,. pp. 538-540.
[232]News Argus, 1901. Pictorial Edition, Lewistown, Montana. Printed by the Fergus County Argus, Lewistown.
[233]Freeman, Ottis W., 1916. Gold Mining in the, Judith Mountains. Montana: Mining and Science Press, Volume 112, pp. 863-865.

The town was the shopping and medical center for the miners and millmen of the area. It had a hospital and four to five doctors. Traveling dentists would come to town periodically and set up shop for a few days. "There were six general stores (Caraway, Barnes, Mercantile, Garrens, Forster and Millinger), a candy store, two barber shops, bakery, two drugstores, clothing store, funeral parlor, four livery barns, butcher shop, six hotels and boarding house, a restaurant, two blacksmith shops, 13 saloons and one blind pig which had no license so sold whiskey through the back door".[234] The red light district consisted of two blocks of houses with extra girls that came in by stagecoach on paydays.[235]

The Barker/Hughesville Mining District

The Barker district includes the mountainous areas drained by the Dry Fork of Belt Creek and its tributaries west of the divide between the Dry Fork of Belt Creek and Dry Wolf Creek and the areas drained by the headwater branches of Otter and Arrow Creeks. Most are in the near vicinity of the old towns of Barker and Hughesville. These old mining camps are in the narrow valley of Galena Creek, which flows southward into the Dry Fork of Belt Creek about 13 miles east from Monarch.[236]

Moving north from Confederate Gulch into the Little Belt Mountains, the first discoveries of gold were made in 1865 in the Yogo mining district, southeast of the Barker/Hughesville district. Prospectors, however, were driven from the area by Indian unrest before development could begin, although by 1878 miners were again working in the Little Belt Mountains north of Confederate Gulch. Gold was again found in the Yogo, district, but the deposits were erratic and sparse. The true riches for which this district is now known, the rare blue gem-quality sapphires, were not discovered until 1896 but with this discovery, the Yogo mining district became the most important gem locality in the United States.[237]

The 1878 discovery of gold in the Little Belt Mountains drew many people to the area. The first of the rich silver-lead deposits in the Barker/Hughesville mining district were found on October 20, 1879 by E.A. "Buck" Barker and Patrick Hughes. They immediately staked the strike, which became the Barker mine. At the same time, they staked another mine in the same vicinity that they called the Grey Eagle.[238]

News of the strike at the Barker mine traveled fast and a classic "boom" period followed in the Barker/Hughesville district. On May 22, 1880, two miners by the names of Hiriam L. Wright and H.K. Edwards found and staked the Wright and Edwards mines.

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[234]Byerly, Ken and Scottie Byerly, n.d. Central Montana's Communities ... yesterday, today and tomorrow. Published by Central Montana Publishing Co., Lewistown.

[235]Ibid. p. 46.

[236]Robertson, Almon F. and Robert N. Roby, 1951. Mines and Mineral Deposits (Except Fuels), Judith Basin County, Montana. Bureau of Mines Information Circular 7602. United States Department of the Interior, U.S. Government Printing Office, Washington D.C. p. 14-15.

[237]Geach, Robert, 1962. Mining in Judith Basic County. Unpublished Paper, Montana Bureau of Mines and Mines, Butte.

[238]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

The ore from these mines was as rich as that of the Barker and Grey Eagle. Other mines discovered during this time included the May and Edna and the Silver Belle.[239]

The Grey Eagle, Barker, Wright and Edwards mines were surveyed in 1881. Claimants listed on the survey of the Grey Eagle and Barker mines, dated April 25-30, 1881, were a group of men headed by Patrick Hughes and Elias Barker. Claimants listed on the survey of the Wright and Edwards lodes, dated April 21-23, 1881 and May 4-5, 1881, were a group of men headed by John W. and Thomas C. Power. Included in the group were Hiriam Wright and H.K. Edwards.[240]

Several of the concerns which were to affect development in this district, and in most mining districts of the west, began to surface during this time. The area was remote and transportation of ore to markets was difficult, slow and expensive. There were also no easily accessible smelting facilities, which could handle the ore from the district, and the price of silver, though high at the time of the initial discoveries, was erratic, thus limiting investment in the mining properties. These concerns were apparent early in the Barker/Hughesville district's development when much of the richest, near-surface ore was being handled. The situation facing the miners in their attempts to get the ore to smelters involved first moving it in ox-drawn wagons over primitive roads to Fort Benton where it was then loaded on boats for transportation down the Missouri and Mississippi River system to New Orleans. Finally, it was transferred to ships for transport to Swansea Wales, which had the nearest smelters that could handle it.[241]

Attempts began almost immediately to overcome these concerns. In January 1881 Col. George Clendenin (also spelled Glendenin) arrived in the district to develop a smelter. By March he had formed the Clendenin Mining and Smelting Company and had begun drawing plans for the smelter. It was to be a four-floor building, 65 feet x 110 feet in size, with a capacity to treat 30-60 tons of ore in a twenty-four hour period. Plans called for it to have a 50 horsepower engine, two Blake crushers, a set of Cornish rolls, a Baker blower and two boilers and it was to be accompanied by a circular sawmill that was to be run by the smelter engine.

When a government land office surveyor surveyed the smelter site on November 7-12, 1881, it was apparent that Col. Clendenin had had a productive year. The buildings on the site included the smelter, a barn, a store, a blacksmith shop and an office. The smelter opened its doors for business on November 27, 1881.[242]

Throughout 1882, mining development continued in the district although on a more sporadic basis than in 1880 and 1881. Although Col. Clendenin was killed by falling rock in the Wright and Edwards mine on February 8, 1882, the smelter continued in operation, treating 934 tons of ore by the end of the year. In 1883, Beehive kilns were

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[239]Ibid. & Weed, W.H., 1900 Geology of the Little Belt Mountains, Montana. United States Geological Survey Twentieth Annual Report., U.S. Government Printing Office, Washington D.C.
[240]GLO records, Butte.
[241]Geach, Robert, 1962. Mining in Judith Basic County. Unpublished Paper, Montana Bureau of Mines and Mines, Butte.
[242]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

built at the smelter, ensuring a sufficient supply of charcoal. It operated throughout most of 1883.[243]

The development of the Barker/Hughesville mining district coincided with a period of rapid growth in the silver industry, throughout the state of Montana. Silver production in Montana grew from producing 7% of the nation's output to becoming the nation's second largest supplier between 1880 and 1883.[244]

Work on the mines in the district continued through 1883, when falling silver prices, depletion of the rich near-surface ores of the first strikes and the news of rich strikes elsewhere in the Little Belt Mountains drew many people away from the area. The Clendenin smelter was shut down at the end of 1883, having produced $375,000 of bullion in the two years it operated.[245]

Although mining development in the area slowed after 1883, efforts continued to overcome the lack of transportation and smelting facilities for the district. In 1888, smelters were built at Great Falls, Helena and Neihart, reducing the distance to such facilities. And in 1891, the Montana Central Railroad was completed between Barker and the Great Northern line at Monarch, making the area more accessible.[246]

By 1891, the area appeared to be headed toward a resurgence of development. In 1890, rich new strikes were reported at the May and Edna, the Liberty and the Wallace mines. Many of the other mines in the district, including the Tiger, the Moulton and the Silver Belle, had also begun to ship ore again during this period. And, the Clendenin smelter properties, which had been sold at a sheriff's sale for $30,000, reopened again under the name Southern Belle.[247]

Several companies, which were to be involved in the future development of the district, were organized during this period. The Block P Mining Company was formed in November 1891, and incorporated in May 1892 from the old owners of the Wright and Edwards mines, with Thomas C. Power of Helena as the president. Power named this company after the flag design of his Missouri River steamboats. Paris Gibson, T.C. Power, C.X. Larrabie and W.G. Conrad owned the Barker and associated mines at this time.[248]

Many small communities sprang up in Galena Creek gulch during this period. The town of Barker was the best known and often gave its name to all the other communities in the gulch. Others, however, included Hughesville (located about two

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[243]Ibid. & Weed, W.H., 1900 Geology of the Little Belt Mountains, Montana. United States Geological Survey Twentieth Annual Report., U.S. Government Printing Office, Washington D.C.

[244]Malone, Michael P. and Richard B. Roeder, 1976. Montana: A History of Two Centuries, University of Washington Press, Seattle.

[245]Geach, Robert, 1962. Mining in Judith Basic County. Unpublished Paper, Montana Bureau of Mines and Mines, Butte.

[246]Ibid.

[247]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

[248]Robertson, Almon F. and Robert N. Roby, 1951. Mines and Mineral Deposits (Except Fuels), Judith Basin County, Montana. Bureau of Mines Information Circular 7602. United States Department of the Interior, U.S. Government Printing Office, Washington D.C. p. 14-15.

miles north of Barker in the vicinity of the Block P mine operation), Gold Run (at the Clendenin mill site near the confluence of Galena Creek and Dry Fork Belt Creek), Central City (located about one-fourth mile from Barker), Leadville (location of a school) and Poverty Flat (also known as Galena City and located near Galena Creek below Leadville). Barker is the only community that continues in existence today.[249]

The hopes for continued growth and development in the district changed with the Panic of 1893 when the national demonitization of silver and the end of the United States government's mandatory silver purchases began to drive the price down. It went from $1.05 an ounce in 1893, eventually dropping to $.53 an ounce by 1902. By the end of 1893, as a direct reaction to the dropping prices, development in the district slowed to almost nothing. Only the richest and most productive mines were able to maintain operations and these were on an intermittent basis and small scale. This pattern set the tone for activity in the district throughout the early decades of the twentieth century as the price of silver stayed low and the large amounts of capital to support growth and development were not generally available.[250]

Other setbacks occurred in the district during this period. The Clendenin smelter burned to the ground in 1895, probably the result of arson. The number of trains run on the Barker-Monarch spur route was gradually reduced and then eliminated in 1903. The tracks were pulled and the line was abandoned later that year. By 1905, the district was again battling the classic problems of western mines of poor transportation facilities, high transportation costs and lack of easily available smelting facilities.[251]

One of the few mines in the district on which some development continued during the first decades of the twentieth century was the Barker. T.C. Power, one of "Helena's fifty millionaires," who first became involved in the Barker/Hughesville district when he bought the Wright and Edwards properties, owned it. He eventually added the Barker and the adjacent Grey Eagle and Belt mines to his holdings, operating them as the Block P properties. In 1910-11, he built a 75-ton water gravity mill/concentrator at the Barker site and in 1912, he enlarged this to a 100 ton capacity and installed new machinery.[252]

As Power began to develop the Barker site, utilization of the remaining mines in the Block P holdings changed. Underground workings among all the mines expanded until they interconnected. Eventually, the Barker became the main working shaft and the shafts at the adjacent mines came to be used only for ventilation and safety.

By 1924, development at the Barker site included the installation of two hoists, a Compressor, an electric generator, three boilers, a dry house, warehouses, a powder magazine, bunkhouses, a boarding house and a mill. Mules were used in the mine from

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[249]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

[250]Geach, Robert, 1962. Mining in Judith Basic County. Unpublished Paper, Montana Bureau of Mines and Mines, Butte.

[251]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

[252]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver.

1924-1927. Production from the properties had increased by 1925 to support a fleet of twelve trucks hauling ore day and night to Monarch.[253]

An analysis of the properties in 1923 indicated the operation had produced 261.31 ounce's of gold, 300 ounces of silver and 1,959,320 pounds of lead in 1922. It was described, however, as having "three great disabilities." These were; 1) lack of adequate transportation facilities from the mine to a mill (the wagon road to Monarch was thirteen miles long and was described "without exaggeration as the worst road that the writer has ever known"); 2) lack of electric power, and 3) lack of adequate milling facilities at the site. The analysis ended by saying: "It is with regret that the statement is made that tens of thousands of dollars have been needlessly lost in the [Block P] operation.[254]

In 1927, the Block P operation was put on the market and sold to the St. Joseph Lead Company for a price in excess of $500,000. The company undertook an extensive building and development plan for the site. The shaft at the mine was sunk from 400 to 600 and eventually reached a depth of 1400 feet. Electric power was brought to the site from Monarch, providing electricity for a 200 horse power motor to run an air compressor and a 100 horsepower motor to run the hoist machinery. A crusher (which was built as part of a tramhouse), a blacksmith shop, tool and machinery shops, a 200 man drying house, hoist and compressor houses, a foreman's office, garages, a new boarding house, a new bunk house with hot and cold running water, showers and a reading room, new bungalows for the superintendent and assistant superintendent of the mine, a four-bed hospital and a house for the resident physician were all completed by early 1929.[255]

The St. Joseph Lead Company also attempted to overcome the transportation and smelting facility problems that had historically plagued the district. A 400-ton flotation mill equipped with the latest methods for concentrating ore was built near the site of the old Clendenin smelter. A 10,250-foot long Leschen Aerial tramway with a capacity of 56 ore buckets was built to transport the ore between the mine and the mill. And a railroad spur was built over the old railroad bed between the millsite and the town of Monarch.[256]

The mill and tramway were completed in 1928 and, with the remainder of construction nearing an end, the plant reached capacity in April 1929. In 1929, it was recorded as being the largest producer of lead ore in the state. A $300,000 profit was recorded from the operation in 1930.[257]

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[253]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

[254]unsigned memoranda, T.C. Power papers., Montana Historical Society.

[255]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.

[256]Ibid.

[257]Spiroff, Kiril, 1934. Geological Observations of the Block P Mine, Hughesville, Montana. Unpublished master's thesis, Montana College of Mining and Technology, Butte.

Unstable national economic conditions again affected development in the district. The order to shut down the Block P operation came through on September 24, 1930. Three hundred and fifty miners were laid off. By May 1931, only two employees remained with the operation, one watchman at the mine and one at the mill.[258]

YOGO MINING DISTRICT
By: Zane L. Fulbright

Confederate escapees from a Union prison camp provided the first account of gold in the Yogo Creek drainage. These escapees-turned-prospectors found traces of placer gold in 1865, but were prevented from establishing claims by hostile Indians. As a result of this conflict of interest, the prospectors left Yogo afoot, heading for California on stolen Army mules and wagons.[259] One of these prospectors returned later when the U.S. Army had more firmly established its presence in the Montana Territory and had the 'Indian Problem* more under control.

Not until 1879 did prospectors develop placer gold mines in the gulch. Two gold placers were located in the Yogo district. The Yogo placer was an alluvium deposit in Yogo Creek, apparently derived from an ore body upstream. These small-scale gold placers proved unprofitable, and most were abandoned for the rich silver and lead deposits discovered in the Barker district a few miles to the northwest.

The earliest mining activity in the Yogo drainage occurred in the area around Yogo Town and the tributaries upstream, or west, of the town. The upper cluster of mines, composed of both lode and placer claims. Yogo Town, also known as Hoover City, displayed some sense of permanence by sporting 100 cabins, two saloons, a store, a boarding house, and 1200-1500 residents. Access to the mining town was difficult; miners and supplies had to come up Dry Wolf Creek and over Elk Saddle to the north. Dudley Hawkins blasted a road through the natural cleft known as Tollgate a few miles down Yogo Creek, improving access to the mines. As toll collector he fared better than the miners.[260]

Yogo district's mining boom was full but brief, acting as a three-year preface to the mining boom at Barker in 1881. The boom consisted of placer and lode mining along Yogo Creek, Skunk Gulch, and more remote tributaries of Yogo Creek. The Weatherwax-Goldbug mine site, located up Skunk Gulch, had a stamp mill; Yogo Town had a two-tub arrastre and overshot wheel.[261]

Mining continued on some of the placer claims and bigger mines through the turn of the century and geared up again during the 1930s at Yogo 1 and 2 (previously known as the Bourke and Larson mines), Weatherwax, Blue Dick, and New Deal mines. In 1943, a

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[258]Wahlberg, Donna, 1989. So Be It: A History of the Barker Mining District, Hughesville and Barker Montana. Privately published, Great Falls.
[259]Voynick, Stephen, 1985. Yogo, the Great American Sapphire. Missoula: Mountain Press Publishing Co. p. 10.
[260]Ibid., p. 12
[261]Robertson, Almon F., and Robert N. Roby, 1951. "Mines and Mineral Deposits (Except Fuels) Judith Basin County, Mont." US Bureau of Mines Information Circular 7602. p. 31,38.

gravity flotation mill was erected in Elk Gulch to treat ores from the Blue Dick mine. In the 1940s the California, Sarsfield, Leonard, and M&M were reopened.[262]

Metals mining in the district fits a subsistence pattern characterized by one or a few miners owning and working claims seasonally. Many of the claims go back to the 1880s and have changed hands often. Because of the remote location and the sporadic nature of the work conducted on many of these claims, such as the Yogo 1 and 2 and the Weatherwax and Goldbug, a number of claims have yet to be patented after fifty to one hundred years of production.

The first claims along lower Yogo Creek, in the area of the sapphire dike, were gold placer claims filed in early 1895 by Simeon S. Hobson and Jake Hoover. Hoover did the bulk of the exploratory work, while Hobson, a rancher and president of the Fergus County Bank in Lewistown, arranged much of the financing. The pair enlisted Jim Bouvet in a partnership. Bouvet, a Chicago veterinarian, provided most of the $38,000 operating money needed to construct a ditch to divert water to their sluice operation. They built the Bouvet Ditch to increase water volume through their gold sluice assemblage on lower Yogo Creek west of the Ogg placer claim. The $38,000 investment proved worthless in terms of gold production; the first season's work netted $700 in gold. Instead, they persisted in finding a bluish rock when they cleaned the sluice. Hoover sent a cigar box of the blue rocks to Tiffany's in New York in November of 1895, where George Frederick Kunz, "the nation's first true gemologist.... Identified the stones as 'sapphires of unusual quality." For his cigar box of rocks, Hoover received a check for $3,750. Instead of gold, the partners discovered their fortune lay in sapphires and shifted their focus.[263]

Jake Hoover's life story captures the flavor of Yogo, and adds a human dimension to the mining record. Hoover was a mountain man and professional hunter, providing meat to the mining camps. When he was not busy with those duties Hoover did some prospecting of his own. Exploratory work and a developed adit at Hoover Spring are credited to Jake Hoover.

Up until 1896 the source of the placer sapphires had yet to be located. In February 1896, sheepherder James Ettien noticed sapphires in gopher mounds along an igneous dike intersecting Yogo Creek. By the end of the year, lode claims stretched along the length of the Yogo dike. In 1897, the New Mine Sapphire Syndicate of London purchased the sapphire claims on the eastern two-thirds of the dike.

In 1896, Patrick T. Sweeney and John Burke claimed the West End of the sapphire dike and developed it as the 'American Mine." In 1904 they sold it to the American Sapphire Company who spent $30,000 building a mill. In 1909, that company sold out to the Yogo American Sapphire Company for $60,000. They, in turn, sold their claims to the

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[262]USDA Forest Service, Lewis & Clark National Forest, 1994. "Draft Eis, Running Wolf Timber Sales." Great Falls. p. 111-54.
[263]Robertson, Almon F., and Robert N. Roby, 1951. "Mines and Mineral Deposits (Except Fuels) Judith Basin County, Mont." US Bureau of Mines Information Circular 7602. p. 41.

English Mine in 1914.[264] Tight operating capital and cramped quarters in the canyon at Kelly Coulee were a constant problem for the American Mine.

By 1899, Hoover had sold his interest and British sapphire experts were involved. They diverted the lower end of the Bouvet Ditch to do sluice and hydraulic processsing along the sapphire dike.[265] Known as the English Mine,* the official name of the claims owners was the New Mine Sapphire Syndicate., They employed C. Gadsden to run the mine from 1903-1923, when a combination of circumstances including a 50% income tax claimed by the U.S., Montana, and England, a declining demand in the European sapphire market, an increased acceptance of synthetic gemstones, and a flash flood which did extensive damage to the English mine, closed the mine in 1923.[266] The sapphire mine did not operate on a full scale again until about 1976.

Castle Mountain District

The mining boom in the Castle Mountains led to the overnight establishment of numerous mining camps: Castle Town, the largest with over 1,500 people; Robinson, Bonanza, Giant, Smith's, and Black Hawk. Castle Town, incorporated in 1887, showed enough early promise to encourage local and state businessmen to invest heavily in its future development. Anton M. Holter, James King, and Albert J. Seligman organized and invested in both the Castle Water and Power Company (1890) and the Castle Real Estate and Improvement Company (1892). Their water company acquired enough water rights to be able to supply a population of 50,000 people in the valley. Confirming the projected growth of the area, in the first sixty days of its existence the Castle Land Company sold over $100,000 worth of lots in its eighty-acre addition to Castle Town.[267]

Rather than remaining a mining camp, Castle Town developed into a community, supporting, at its prime, nine stores, one bank, two barber shops, two butcher shops, two livery stables, two hotels, a photo gallery, dance hall, church, school, jail, brass band, 14 saloons, four newspapers, three smelters and a Vigilance committee. "The town also managed to support a red-light district. Professor Cronk and Mrs. Alice S.N. Barnes were two of the first teachers in Castle's two-room, two-story schoolhouse. Mrs. Barnes, wife of H.H. Barnes, also served as a minister, and organized the W.C.T.U.. A largely Norwegian agricultual community supported Castle Town. Ray Rhoads, who believed himself to be the first boy born in Castle Town (May 30, 1888) remembered his mother hiring Carrie Rostad, a Norwegian girl, to work for her. Carrie Rostad, like many Norwegians in the community at the time, could not speak English. Like Neihart, Castle had a Chinese laundry; other than the individual operating the laundry not much of an Asian population resided in Castle Town. Not all the goods and luxuries desired in Castle could be locally produced, so many of the goods were brought in by freight. The Sears & Roebuck catalog was popular in Castle in the 1890s, and provided

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[264]Voynick, Stephen, 1985. Yogo, the Great American Sapphire. Missoula: Mountain Press Publishing Co. p. 78.
[265]Ibid., p. 40.
[266]Ibid., p. 106.
[267]Fulbright, Zane, *1994*. "Miners, Movers, and Moldboards: The Settlement of the Castle Mountains." (unpub lished manuscript) *professional paper, Montana State University, Bozeman. p. 6-7.

residents with access to outside goods, trends, and fashions, reading material, and wishes. Rhoads remembered, "It was a special day when the goods arrived".[268]

In mining towns such as Castle, unmarried women who were not prostitutes or servants were something of an oddity. Annie Carr was one of these unmarried women. Actually, she had been married, and widowed, twice. She and her five children moved to Castle, where she operated a rooming house during the school year, and improved a desert land entry (later converted to a Forest Homestead entry) on Warm Springs Creek during the summers.

Like all stereotypical mining towns, Castle had its infamous resident, the notorious Calamity Jane. Her arrival was less than dramatic: she and Dotty Donovan, another colorful character, brought a load of fresh vegetables up from Livingston. Ray Rhoads remembered his father telling about these women handling 100-pound sacks of potatoes. Calamity Jane stayed less than a year in town, but while there did enroll her daughter in school.[269]

In an effort to circumvent exploitative railroad shipping costs, coal was mined locally for use in the smelters, as well as private homes. Spencer, Mayn, and Heitmann, White Sulphur Springs businessmen, mined a coal seam at Checkerboard Creek. Until the Warm Springs seam was developed, this was the only available source of coal due to the prohibitive cost of shipping from Livingston. Another coal seam was exposed on the ridge between Hensley and Hamilton Creeks, but it was too impure to use as fuel. The best coal in the range was found in a seam near the mouth of Warm Springs Creek, described by Weed as "the best fuels yet discovered near the mines. Even with this description the seam had its flaws. At the mouth of the creek the vertical coal beds, while pure enough, were only a few feet above the water level. The seam appeared to continue up the slope, so the seam could be developed if the demand warranted it. Another seam of coal existed above the charcoal kilns on Warm Springs Creek (Annie Carr's homestead?), but it was too impure to use as fuel. Coal located on the Doucet Ranch, also on Warm Springs Creek, was poor in quality, but it was sold in Castle for use in private homes. This seam continues up an eastern branch of the creek, but it was not workable due to its association with ferruginous sandstone. The sandstone, however, was quarried for use as flux for the smelters.[270]
The fate of the Castle mining district, also known locally as "Leadville,' depended on the price of silver and the development of a railroad into the camp. G. C. Swallow, Montana inspector of mines wrote in 1890 that Castle mines could save fifteen to twenty dollars a ton if a railroad were developed. As the smelters closed due to the changing ore content, Castle residents more earnestly campaigned local businessmen and eastern capitalists to develop a rail link.

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[268]Meagher County Historical Society, *1968. Meagher County.* An Early-Day Pictorial History 1867-1967. White Sulphur Springs: The Meagher County News. p. 67.
[269]Rhoads, Ray, *1977.* 'Tale of a Ten Year Old." Oral history, transcribed by Carol Rhoads (unpublished).
[270]Weed, Walter Henry, and L. V. Pirsson, 1896. "Geology of the Castle Mtn. Mining District, Montana.' Bulletin of the USGS No. 139. Washington: Government Printing Office. p. 148.

Castle Town owed much of its prosperity to the enactment of the Sherman Silver Purchase Act of 1890. This act guaranteed the stability of the price of silver, based on artificial price supports maintained by the federal government. In 1889, prior to the act's passage, the silver price was $0.935 per ounce; one year later, in. response to the act, prices jumped to $1.21 per ounce. Unfortunately for silver miners throughout the West, the longevity of the Sherman Act was not assured. While silver prices rose, gold experienced devaluation. While Castle Mountain miners were exposing silver and lead deposits, prospectors in Alaska and South Africa discovered rich gold ores. The abundance and subsequent devaluation of gold, combined with the effects of the shutdown of British silver mines in India, led to the Panic of 1893. Worldwide developments, combined with labor strife in eastern industrial centers, led to Congress' decision to repeal the artificial price supports ensured with the Sherman Silver Purchase Act. As a result, silver prices in 1893 plummeted to $0.62 per ounce. The mining industry came to a standstill, forcing most speculators out of business.

Chances for a railway to the Castle mines suffered a severe setback in 1893, when Congress demonetized silver. Even with the economic turmoil accompanying the repeal of the Sherman Silver Purchase Act, Richard A. Harlow managed to acquire financial backing to support the construction of a railroad in central Montana, east from Toston along the south fork of the Musselshell River. Throughout the depression railroad construction continued. To access the mining market at Castle Town, Harlow constructed a spur line from Loweth (Summit) to Leadboro, terminating a half-mile below Castle Town. "By May 26,1895, 156 cars of ore had been hauled from Leadboro, to the smelter at East Helena. 'The completion of the line caused a brief revival in the Castle mines, lasting until 1898, when yet another depression struck the country. Most of the ore shipped on Harlow's Jawbone, so named because of the amount of persuasion needed to raise financial support for the railroad, came from stockpiled ore; most of the mines never reopened. Meagher County Commissioners finally dis-incorporated the town of Castle in 1976.[271]

Sporadic mining continued at the Castle mines, but production has not equalled that in the 1890s. In 1943 lessees under the direction of John Oliphant began further exploratory work in the mineral zone. Regular ore shipments resumed in 1957 when both the Yellowstone and Cumberland mines began new development work. H. 0. Mining Company (HOCO, Inc.) operated the Cumberland until at least 1964, yielding most of the county's lead production during its operation. The Yellowstone mine, operated by Hamilton Mines, Inc. and George Voldseth, was the second largest producer.[272]

A hematite ore body attracted miners to the Willow Creek area of the Castle Mountains, approximately six miles east of White Sulphur Springs. Most mining activity in the Castle Mountains occurred on the south flank in the vicinity of Castle Town, and on the

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[271]Baker, Don, *1990. The Montana Railroad. Boulder,* Colorado: Fred Pruett. p. 35.

[272]Winters, Allen S., 1968. "Geology and Ore Deposits of the Castle Mountain Mining District Meagher County, Montana., Montana Bureau of Mines and Geology Bulletin 64. Butte: Montana College of Mineral Science and Technology. p. 21-22.

north flank at Copperopolis. Minimal mineral exploration occurred in the northeast corner of the Castle Mountains, where this ore body was located. In 1918, William F. Word located the Cut Back Lode, which contained iron with traces of silver. Richard Manger, M. M. Mahurin, and Herman Stohr also located three claims in T9N R7E section 26. Iron was the dominant mineral. Ringling Consolidated acquired the Manger, Mahurin, and Stohr claims, probably in 1924 when the location of the claims was amended. The Ringling and Consolidated lodes went to patent in 1929, but the Tiptoe lode was eventually cancelled for lack of mineral wealth.

Based on the amount of development occurring, the Ringling lode should have been the most productive of Ringling Consolidated's claims. Access to the claim was by a 1500-foot long, 12-foot wide graded road with a 3-foot bank, and a 600 foot long, 16 foot wide ungraded road. The Ringling claim also had: an ore bin and chute constructed of logs and poles; a 24xl4 foot pole building with drop siding and a rubberoid roof; a 4x6x6 foot powder house of pole construction; and a 13xl3x8 foot blacksmith shop of pole frame construction with drop siding and a rubberoid roof, with holes for the door and window, with a dirt floor.

Perhaps because of the lack of a mineral body on the claim, the Tiptoe had most of the Ringling claims' surface structures, some of which might have dated to 1918. Buildings on the claim included: a 16x24x8 foot log mess cabin with a rubberoid roof and a finished floor; a 22x36xl0 foot log bunkhouse with a shingle roof, varnished floor, brick and stone fireplace with a steel smokestack; a 12xl2x6 foot frame stable with a pole corral; two 4x4x6 foot board and pole toilets; and a 4x7x5.5 foot springhouse with a matched beaded ceiling. At some point prior to 1927, the mess cabin and bunkhouse were connected with a new log building, which had a rubberoid roof and finished floor, and measured 16x25x7 feet.

Six-horse teams hauled approximately 5,000 tons of ore from the Willow Creek mines to White Sulphur Springs, where it was loaded on the rail line and shipped to American Smelting & Refining Company's East Helena smelter. The ore was used for fluxing purposes. Approximately one carload a day was being shipped in 1921.

MUSSELSHELL DISTRICT

The earliest development in the district occurred in 1866, with the discovery of a rich copper vein near Elizabeth Scott's stage station and hotel, which became known as Copperopolis, located eighteen miles east of White Sulphur Springs in the northern foothills of the Castle Mountains. The veins occur in mineralized and hydrothermally altered fissures. These fissures could be fault lines, but not all show signs of displacement.[273]

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[273]Blumer, John W., *1971.* "Geology of the Deadman Canyon-Copperopolis Area Meagher County, Montana." Master's thesis, Montana College of Mineral Science and Technology, Butte. p. 41.

Copperopolis was reported to have been the site of the first copper ore discovered in Montana.[274] Hauling costs proved prohibitive to the development of the mines. Early ore shipments were sent to Swansea, Wales for smelting since the facilities did not yet exist in the Montana Territory. For the first thirty years of its existence Copperopolis basically slept, waiting for improved transportation and hauling to export the copper ore. Only a small amount of ore was shipped out of Copperopolis until Richard Harlow's Montana Railroad reached Martinsdale in 1896.

Copperopolis's fortunes took another turn for the better in 1900, when Copper King Marcus Daly, in another attempt to crush the competition (namely William Clark), bought the majority of Copperopolis mineral prospects. Even though he died later that same year, Daly's investments in the copper mines allowed Copperopolis to flourish as an Anaconda Company town. The promise of the mines, developed by outside capital, encouraged The *Rocky Mountain Husbandman's* editor to write 'The mines of this point have been proven beyond question to be permanent and the foundation of a new copper metropolis is now laid." What the editor could not foresee was the 1903 closure of the mines. Labor strife in Butte and Anaconda mines, coupled with the 1901 economic depression in Germany (consumers of half the U.S. copper exports), forced copper prices lower and mines to close. Miners and their families abandoned the 'copper metropolis;" 'dry-landers" attempting to establish homesteads in the area around 1915 tore down remaining buildings, salvaging the lumber for use in their own homes.[275]

When Roby inspected the area in 1950, the Copperopolis mine consisted of 21 patented claims, owned by the Daly Realty Company of Hamilton, Montana. Three claims produced the bulk of the mines output: North (ern) Pacific, St. John, and Darling Fraction.[276] The North Pacific, owned by the Copperopolis Mining Company and managed, by W.W. McDowell, had 625 feet of shafts and over 2000 feet of drifts driven by 1901. Additional access to the workings, consisting of two 200-foot shafts, was developed on adjacent claims.[277]

The Copper Duke, the last mine operating in the area, finally ceased operations in 1961. It was owned by Milton Mayn of Martinsdale, and last operated by Claude Wetzel of Checkerboard.[278]

CUMBERLAND MINE (In the Castle Mountains District)
By: Mitzi Rossillon (RTI)

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[274]Fulbright, Zane, *1994.* "Miners, Movers, and Moldboards: The Settlement of the Castle Mountains." (unpub lished manuscript) *professional paper, Montana State University, Bozeman. p. 5.
[275]Ibid.
[276]Roby, Robert N., 1950. "Mines and Mineral Deposits (Except Fuels) Meagher County, Mont.' US Bureau of Mines Information Circular 7540. p. 29.
[277]Blumer, John W., *1971.* "Geology of the Deadman Canyon-Copperopolis Area Meagher County, Montana." Master's thesis, Montana College of Mineral Science and Technology, Butte. p. 57.
[278]Ibid.

The Cumberland Mine was the most important of the silver-lead ore producers in the Castle Mountains during the late nineteenth century. It and the nearby Yellowstone Mine were the centerpieces of the Castle Mountain Mining District, but numerous other mining properties were developed in the area beginning in the early to middle 1880s. Interest in the district sparked the development of the small community of Castle, which stood downstream from the Cumberland and Yellowstone Mines. A wide range of businesses served its peak population of up to 2,000. Lacking convenient railroad service during the 1880s and early to middle 1890s, mine owners' attempts to treat the silver ore locally were only moderately successful. Several factors contributed to the short life of early mining in the Castle district, the most crushing of which was the collapse of the silver market in 1893.[279]

The Cumberland Mining and Smelting Company was the first entity to conduct any significant development and mining at the Cumberland Mine. Organized in 1887, the company initially extracted ore through two shafts near the top of a high hill on the Cumberland mining claim. In 1888, the main workings were moved to a new three-compartment, vertical shaft near Castle Creek on the adjacent Stonewall Jackson claim.[280] A hoist and pumps were housed in a large building, which stood over the new shaft.

Initially, Cumberland Mining and Smelting shipped lead-silver ore outside the district for processing.[281] But in 1888, the Yellowstone Mining and Smelting Company erected a smelter near the south end of Castle. Cumberland ore was processed at the Yellowstone smelter until about 1891.[282] At that time, Cumberland Mining and Smelting constructed its own smelter near its large hoisting works. As of spring 1892, the second facility had reduced 13,000 tons of ore, valued at just under one-half million dollars.[283]

The early 1890s production quickly ended, and the Cumberland Mine never regained its former prominence. Due to a shareholder's revolt and company reorganization, the smelter was closed and the total workforce reduced significantly. Then, the mine was closed in 1893.[284] It re-opened briefly in the late 1890s, and was worked by various parties, including lessees who shipped material from the dump.[285]

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[279]GCM Services, Inc., 1995 Castle Mountains Mining District, draft. Butte. Submitted to the Montana Department of State Lands, Helena. p. 1-2.

[280]Weed, W., and L. Pirsson, 1896. Geology of the Castle Mountain Mining District Montana. U.S. Geological Survey Bulletin 139. p. 153.

[281]Roby, R.N., 1950. Mines and Mineral Deposits (Except Fuels) Meagher County, Mont. U.S. Bureau of Mines Information Circular 7540. p. 17.

[282]Montana Inspector of Mines, 1890. Reports of the Inspector of Mines and Deputy Inspector of Mines for the Six Months Ending November 30th, 1889. Journal Publishing Co., Helena. p. 17.

[283]MacKnight, J.A., 1892. The Mines of Montana. C.K. Wells Co., Helena. p. 100.

[284]Montana Inspector of Mines, 1892 Fourth Annual Report of the Inspector of Mines of the State of Montana. C.K. Wells Co., Helena. p. 153.

[285]Western Mining World, 1898 8 (176):55. 29 January.

After about 25 years of inactivity, there was renewed interest in the Cumberland Mine. Some smelter slag was shipped and the mine itself may have been re-opened for a brief time in the 1920s.[286]

But it was not until the 1940s that the next (and last) major period of activity ensued. Area ranchers Russell and Clara Manger acquired the Cumberland group of mining claims in 1942.[287] Soon thereafter, they began a 25-year period of leasing out the property to a series of individuals and mining companies. Minor shipments of ore were made from a "small shaft" and the waste dump in the middle 1940s. It was also at that time that a party(s) drove an adit from the level of the former smelter, and attempted to dry out the inclined shaft that opened at the top of the mine. Beginning in 1948, Silverton Mines, Inc became interested in the Cumberland. Most of its work was confined to exploration and development, although there was some minor production.[288] After Silverton Mines dropped its lease in 1951, other parties took up the property, both developing and mining to a limited extent. It was in the middle 1950s that plans were made to dry out the lower, main shaft where the large hoisting works had once stood.[289] HOCO, INC conducted the last significant work during this period of activity. The company leased the Cumberland beginning in 1957. It reportedly opened an "old shaft" and also worked out of the 1945 adit. From 1957 through 1962, the company shipped just under 4,000 tons of ore. Work by a related corporation continued to 1966.[290] Except for exploration and a very small shipment of ore in the late 1960s, there has been no mining at the Cumberland since the mid 1960s.[291]

JUMBO MINE

By comparison with the Cumberland Mine, the Jumbo Mine was an insignificant operation. The Jumbo mining claim was located in 1886, but there is nothing to indicate that work progressed past the development stage until just before the turn of the century.[292] By that time, the Jumbo group of claims had come to cover 160 acres, although work was mostly confined to the south side of Jumbo Hill, or near the Cumberland principal mining operation of the late 1880s and early 1890s.[293] The Jumbo Mining and Development Company shipped ore from the Jumbo Mine from 1897 to 1899. Lessees re-opened the mine in 1902 for one short season, and others shipped "a few cars of sulphide lead ore" in 1926.[294] Except for some possible exploration work conducted during the modern period, there apparently has been no work at the Jumbo for the last 70 years.

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[286]Mining and Scientific Press, 1921. Montana. 122:173. 29 January.
[287]Meagher County Clerk and Recorder, 1942 Deeds between Jennie 0. Symons, Emma 0. Schilling, Blanche Oppenheimer, and the estate of Celia 0. Joseph and Russell and Clara Manger, I 1 and 28 February.
[288]Reyner, M.L., 1950. Directory of Montana Mining Properties 1949. Montana Bureau of Mines and Geology Memoir 31.
[289]Minerals Yearbook 1952:556; 1953:612; 1954:647.
[290]HOCO, ca. 1962. The Cumberland Mine. On file, Mining Property File, Montana Bureau of Mines and Geology, Butte.
[291]Montana Bureau of Mines and Geology, 1967. Summary Sheet State Technical Services Mine Visit Program, for Cumberland Mine, I November. On file, Mining Property File, Montana Bureau of Mines and Geology, Butte.
[292]Northwest Magazine, 1891. The Castle Mining Region. January, pp. 18-25.
[293] Ibid., pp. 21-22
[294]Western Mining World, 1897 7 (165):592. 13 November, 1898 8 (176):55. 29 January, 1902 16 (16):..14. 19 April.

REGION 5

In the Southcentral portion of the State Region 5 is located. Park, Sweetgrass, Stillwater, and Carbon counties are the four of the six counties in this region that contain mining districts. Yellowstone and Big Horn Counties to the east had little or no hard rock or placer mining. Most of the districts in this region were less significant then the districts covered in detail here. Of these the Clark Fork district had low-grade placer with only about $1,130.00 taken out near Belfry. The Hellroaring district was known for chromite deposits located near Red Lodge and worked mostly in the 1930s. Located just north of the Hellroaring district was the Silver Run district. Chromite was also worked here, and it had a mill, but not a lot of production to feed it. The Cowles district had early placer (1866) then it was worked again in 1871. Load material was found in 1879, but was on Crow Indian land. This district had little load production, and had no real community development.

Crazy Mountain district had more coal then mineral development owing to its topography. Gallatin district likewise had low production and development. This was also the case with the Horseshoe district, which was located just north of the Yellowsone Park. The Livingston district contained the town of Livingston, which was a shiping point for other districts in the area, but it had very little production.

Nye district was located just north of the New World district and was located on land that was part of the Crow Indian lands, and so developed later. In 1883 Jack V Nye and the Hedges brothers discovered Sulphide rich copper-nickel. In 1886 three eastern cmpanies made more investments in the area. In 1889 the Secretary of the Interior found that the town of Nye was on Crow lands and so it was abandoned. In 1904 the boundry line of the Crow Reservation was moved east and World War I saw a demand for chromite, but Nye & Limestone did not delvelop much of a population. Jack Nye, and Jim and JonasHedges also explored West Stillwater early on in 1883 and this district shared much of the history of the Nye district located to the east and south.

The Yellowstone River was located near Columbus and had only very limited placer activity in the late 1860s. This was much like the Big Timber Canyon, which also had very small placer production, and no significant community development.

Boulder River was another district impacted early on by the Crow Reservation boundry question. Later in the 1890s the district had a few booms. During the 1890s the town of Independence was built and in 1935 Contact was settled during a later development with both having post offices for a short time. Natural Bridge district had limited development and since 1935 only were sending out test shipments. In 1957 U.S. Steel began strip mining on Iron Mountain.

Historical Background on the Sheepeater & Crevasse (Crevice) Mountain District
By: Ann E. Samuelson

Originally referred to as the Sheepeater and Crevasse Mountain Unorganized Mining District, the Crevice Mountain mining area is among the earliest known in this area`. First discovered in 1879 by Neil Gillis and Charles H. Wyman, the area is composed of over 30 patented mining claims and numerous unpatented ones.[295] Gold, arsenic, and tungsten (a form of scheelite commonly used in the hardening of metals) are the predominate minerals found in the area.

At Crevice Mountain ore deposits occur in a belt one-mile wide and one and three-quarters miles long extending northward from Yellowstone National Park to Palmer Creek.[296] Although some development at Crevice Mountain resulted from the efforts of organized mining firms, it was primarily the result of small-scale individual placer mining operations.[297] The Crevice Mountain mining production was of minor importance compared to other mining centers of the United States.[298] Like many such minor mining areas, the pattern of development at Crevice Mountain began with a period of exploration, followed by a brief interlude of development, and then a long period of idleness often marked be receivership and reorganization of the mining firms.[299]

Historically, the Snowshoe Mine consisted of the Hulse group of mining claims which included the Snowshoe, Fowler, Jupiter, Cuckoo, Kentuck, Pratt, Venus, Mars, Tower Grove, and Old Crow claims.[300] Originally recorded in the 1880s, the Hulse group was first explored in 1892 by the Park View Mining Company. Although this company did no actual mining, they did undertake considerable exploration of the mineral deposits in the area.[301]

The Hulse group of claims remained dormant until 1921 when interest was revived in the arsenic market. Don Davenport of Livingston leased the Hulse group, along with another group of cliams, the Hageman group, and formed the American Gold Mines Company. This company was replaced the next year by the Treloar Arsenic Gold Trust, which carried on modest exploration during 1923 and 1924. In 1926 the Treloar Arsenic Gold Trust was reorganized and incorporated as the Crevasse Mountain Mining Company. This latter company was only composed of the Hulse group of claims.

In 1931, the Crevasse Mountain Mining Company leased the Snowshoe property to Edgar Wild, James Rearton, and Norman Bongard. They installed a pebble mill during the following winter and in the summer of 1932 approximately 800 tons of oxidized ore

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[295]Seager, George F., 1944. "Gold, Arsenic and Tungsten Deposits of the Jardine-Crevasse Mountain district, Park County, Montana." Montana Bureau of Mines and Geology Memoir #23, Montana School of Mines, Butte, Montana. p. 97.
[296]Ibid., p. 1.
[297]Ibid., p. 13.
[298]Reed, Glenn C., 1950. "Mines and Mineral Deposits (Except Fuels), Park County, Montana." United States Department of Interior, Bureau of Mines Information Circular 7546, Washington, D. C., p. 9.
[299]Ibid., p. 8.
[300]Seager, George F., 1944. "Gold, Arsenic and Tungsten Deposits of the Jardine-Crevasse Mountain district, Park County, Montana." Montana Bureau of Mines and Geology Memoir #23, Montana School of Mines, Butte, Montana. p. 15.
[301]Reed, Glenn C., 1950. "Mines and Mineral Deposits (Except Fuels), Park County, Montana." United States Department of Interior, Bureau of Mines Information Circular 7546, Washington, D. C., p. 33.

were milled over amalgamation plates; these were said to average 0.21 ounces of gold per ton.[302]

In 1934 the Crevasse Mountain Mining Company leased its holdings to the Snowshoe Mining Company. This company confined its operation to the summer months, as water was unavailable during the winter.[303] At this time a 35-ton gasoline powered amalgamation floatation mill was installed and as many as 12 people at a time were employed at the mill and mine. Improvements to the site at this time included the installation of a boarding house and various shops. Total production during this period is reported to be about $25,000.[304] Work at the site was discontinued in 1939.[305]

During the Second World War, new attention was directed toward toward Crevice Mountain as a possible source of Tungsten. In 1943 the U. S. Bureau of Mines examined and sampled some of the deposits at the Snowshoe claim. No further work was done at the site, however.[306]

New World Mining District
By: Dale Gray

To understand the historical significance of the Republic Smelter, it is necessary to view it within context of the historical New World Mining District in which it functioned and the Republic Mine which provided it with ore.

New World Mining District

The New World Mining District is a mountainous tract at an elevation over 7,000 feet, and consequently is inaccessible during winters. Timber and water are plentiful, but the lack of and expense of transportation was the greatest drawback to development of this district. Historic activity in the area consisted of gold, silver, lead, zinc and copper mining. Although several hard rock mines were located on Henderson Mountain in the late 1870s, they were not extensively developed until the late 1880s. The bulk of mining activity in the district, limited as it was, occurred on Republic Mountain, south of Cooke City and at Miller Mountain, north of the camp of Cooke City during the 1870s.[307]

Although placer deposits in most of the valleys in the district have been worked off and on by several companies, yields are not known for most years. Gold production from

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[302]Seager, George F., 1944. "Gold, Arsenic and Tungsten Deposits of the Jardine-Crevasse Mountain district, Park County, Montana." Montana Bureau of Mines and Geology Memoir #23, Montana School of Mines, Butte, Montana. p. 15.
[303]Ibid., p. 104.
[304]Reed, Glenn C., 1950. "Mines and Mineral Deposits (Except Fuels), Park County, Montana." United States Department of Interior, Bureau of Mines Information Circular 7546, Washington, D. C., p. 33-34.
[305]Seager, George F., 1944. "Gold, Arsenic and Tungsten Deposits of the Jardine-Crevasse Mountain district, Park County, Montana." Montana Bureau of Mines and Geology Memoir #23, Montana School of Mines, Butte, Montana. p. 15.
[306]Ibid., p. 16.
[307]Sahinen, Uuno Mathias, 1935. Mining Districts of Montana, A Thesis Submitted to the Department of Geology in Partial Fulfillment of the Requirements for the Degree of Master of Science in Geological Engineering.

placers were reported for the district as a whole in 1933 and 1934, with 195 ounces and 5 ounces reported respectively[308]

Initial Prospecting (1869-1882)

In 1869, while fleeing an Indian attack and following rumors of rich gold, silver and lead deposits, a small party of prospectors, including Adam "Horn" Miller, J. H. Moore, James Gurley and Bart Henderson, arrived in the vicinity of the headwaters of the Clark's Fork (of the Yellowstone) and Stillwater Rivers.

Finding promising "float" gold deposits on either Fisher or Upper Soda Butte Creeks, the party returned to the settlements in southwest Montana Territory to spend the winter. The next year, the group returned to establish a number of mining claims on Republic Mountain. By 1871, additional claims had been staked on Henderson and Miller Mountains, which flanked Miller Creek, north of Republic Mountain. In 1875, a small Mexican-style roasting furnace had been built near the small town that had been established to supply the miners in the area. The Nez Perce Indians, in their flight from the military after the Big Hole battle and after crossing through Yellowstone Park, passed through the area in 1877 but did not attack the miners and traders in the district. However, local legend states that the fleeing Indians confiscated lead bullion from the furnace for use as ammunition.

Philadelphia financier Jay Cooke visited the small community in 1879, promising to build a railroad to serve the area's fledgling hard rock mines. In response to the entrepreneur's promise residents of the tiny community chose to name their camp Cooke City and bonded over the Republic mine and smelter property to Cooke. While Cooke made an initial $5,000 payment on the bond, he failed to make the final bond payments. The property reverted to George Huston, a local mining promoter. The railroad, consequently, was never constructed. The Republic mine, plagued by the high cost of mule-back freight, closed shortly thereafter.

Developmental work in the Cooke City area was also hampered because the miners were illegally trespassing on the Crow Indian Reservation. Responding to the demands of the miners and Yellowstone Valley stockmen, the government reduced the size of the reservation by approximately one-half in 1882; the New World mining district was then established. The subsequent rush to the area created the New World mining district's first boom.[309]

Mining activity in the region increased once the mineral rich territory became available for exploitation. Jack Allen pushed a wagon road through the mountains to connect the area to Gardiner in April of 1882. The lower shipping rates and larger wagonloads made small-scale industrial development of the area possible. South of Cooke City,

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[308]Lovering, Thomas F., 1929. "The New World or Cooke City Mining District, Park County, Montana",

[309]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Swallow Press/Ohio University Press, Athens.

Major G. 0. Eaton began to redevelop the Republic Mine properties with the construction of a lead smelter in 1883. The smelter became operational the following year.

Historic activity in the area consisted of gold, silver, lead, zinc and copper mining. Large-scale exploitation of the area's mineral resources was hampered by the lack of a reliable transportation system, the rugged topography and the short mining season at high elevations. Moreover, the creation of Yellowstone National Park in 1872, and the Yellowstone Park Timberland Reserve in 1892 served to further isolate the already remote mining district. There was only marginal development in the area during the 1870s because prospecting and mining were not allowed within the Crow Reservation boundaries. Consequently, although there was prospecting and some lode development, it was speculative and marginal since there was no legal basis for roads, railroads, or ownership of claims. In April of 1882, the Crow Reservation was essentially halved, opening up the mountains for gold seekers. Although some evidence of the initial prospecting (1869-1882) may remain in the Miller Creek Drainage, little or no documentation of these locations exists.

The bulk of mining activity in the district occurred between 1887 and 1894 and from 1916 to 1930, with some open-cut mining on Fisher Mountain from 1934 to 1955. The landscape is dotted with small prospect pits, adits, shafts, waste rock dumps and the remains of a stamp mill, copper smelter and numerous ore bins, compressor houses, tram towers, hoist houses and residences dating from 1887 to 1955.[310]

Unlike the more extensive operations at Butte or other mining areas in the state, poor transportation, seasonal mining activity and rugged terrain hampered the New World mines. However, in spite of the odds the district proved to be a prolific producer of precious metals in Montana.[311]

Early Period (1882-1894): Development of the New World Mining District

Although mining activity has occurred in the New World District since 1869 when "Horn" Miller and his cohorts found gold in the area, politics dictated that little work could be carried out until 1882 when the area was officially opened to mining. From then until the effects of the silver crash of 1893 were felt, the area was busy and productive, making the initial period of significance from 1882 to 1894.

It is possible that some remains in the Miller Creek valley are from early prospecting activities predating 1882 but this cannot be documented. Although several hard rock mines were located on Henderson Mountain in the late 1870s, they were not extensively developed until the late 1880s. The first mining activity in the district occurred on Republic Mountain, south of Cooke City and at Miller Mountain, north of the camp of

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[310]Gray, Dale M., 1991. "Cultural Resource Inventory and Assessment for the Proposed Workers Camp Area in the Noranda, New World Mining Project. Prepared by GCM Services.

[311]Gallatin National Forest, 1976. Final Environmental Impact Statement, Beartooth Plateau: Custer, Gallatin, Shoshone National Forests. USDA-FS-R2-FES (ADM) FY-76-11.

Cooke City during the 1870s. After the failure of Jay Cooke's attempts to build a railroad spur line to Cooke City, the Republic Mine ceased their limited operations until the 1880s with the mining emphasis, instead, shifting to Henderson and Scotch Bonnet Mountains and Fisher Creek.

Beginning in 1882, mining development of the district was steady. In 1882, George 0. Eaton bought the Great Republic, Greely, Houston, and New World mining claims and organized the Republic Mining Company. By 1883, the company had spent $300,000 in developing the property and building the Cooke City or Republic smelter, which operated unsuccessfully throughout 1884 until a roasting furnace was added in 1885. That fall, 440 tons of silver-lead bullion were produced and sold for $95,000, but the profits were canceled by the cost of coke and transportation.[312]

In 1885, mining development moved north of Cooke City. In that year, Sam Mathers filed on the Homestake claim high above Fisher Creek on Henderson Mountain. By 1887, the mine had produced enough gold and silver ore to ship to Salt Lake City for processing. The Homestake proved to be rich in gold, silver and lead ore and was mined extensively until 1894. To accommodate the miners and their families, Mathers constructed a small tent camp approximately 100 yards northwest and below the mine. Two other mines on Henderson Mountain, the Daisy and Alice E. properties began to be developed by 1888. When thirteen carloads of ore from the Daisy mine were shipped to Omaha for processing, the ore assayed at $50 per ton. This prompted the Daisy Mining Company to further expand their operations on Henderson Mountain. By 1890, the company had constructed a small stamp mill, boarding house, stables and cabins at the mine. The Daisy works were distributed among three adits with approximately 2,385 feet of underground workings. The Alice E. mine produced 2,500 tons of ore worth $14 per ton in a two-year period. By 1890, 300 additional claims had been filed in the New World Mining District, with 259 of the claims located on Henderson, Scotch Bonnet, Crown Butte and Fisher (Red) Mountains. Together, these mines produced most of the over $50,000 in gold ore shipped from the district in the 1890s. However, by 1894, falling silver prices, a subsequent national economic slowdown and the general inaccessibility of the mines caused the virtual cessation of mining operations in the New World district. The Bliss Mining Company that desultorily had mined the lower tunnel until at least 1912 purchased the Daisy complex in 1900. By 1920, the Western Smelting and Power Company purchased the Daisy, Alice E. and Homestake claims.[313]

The Homestake, Daisy and Alice E. mines provided the bulk of mineral production in the New World district in the late 19th century. Associated with the Homestake was a tent camp established to house the workers. The Isabelle mine on the southeast ridge of Henderson Mountain may also date from this period.

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[312]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Swallow Press/Ohio University Press, Athens.

[313]Walsh, William, 1910. Biennial Report of the Inspector of Mines of the State of Montana for the Years, 1909-1910.: Independent Publishing Company, Helena.

The second period (1910-1929)

The second period of significance began around 1910 when investment interest was renewed in the area. This period saw major construction and activity, but little actual production. The stock market crash of 1929 curtailed any investing and this effectively ended mining development in the district. Most of the activity in the second period of significance (1910-1929) took place along the Fisher Creek drainage. The Tredennick, Glengarry, and, particularly the elaborate developments of the Western Smelting and Power Company illustrate the activities of this period.

Professor Gottwerth L. "Doc" Tanzer formed the Western Smelting and Power Company in 1904. Originally called the Precious Metals Company and, later, the New World Mining, Milling & Producing Company, Tanzer began purchasing mining claims in the vicinity of Henderson, Scotch Bonnet and Sheep Mountains by 1910. After consolidating his holdings, Tanzer began raising capital for a large-scale mining venture from financial sources throughout the United States and Europe. In 1916, the renamed Western Smelting and Power Company completed construction on a 250-kilowatt hydroelectric plant three miles east of Cooke City on the Clark's Fork River and began building a 350-ton smelter on Fisher Creek, two miles southeast of the Homestake mine. The hydroelectric plant provided power to the air drills and compressors at the Homestake the smelter and mine. The plant also provided electricity to illuminate the mine tunnels and the buildings constructed by Western between 1916 and 1925. By 1918, the company reopened the Homestake mine, but, instead, placed the emphasis on copper ore rather than gold (although gold and lead continued to be mined at the Homestake). Tanzer believed, perhaps prematurely, that the ore body present at the Homestake could be tapped more efficiently by a mine located lower on the mountain. The result was the beginning of the New World district's most active era.[314]

As the Western Company began developing its properties in the New World district, a number of smaller companies also became active in the area. The most prominent of these were the Glengarry Mining Company and the Tredennick Development Company. The Miles City and Livingston-based Glengarry Company owned 28 patented claims on Scotch Bonnet Mountain in the vicinity of Lulu Pass and began mining operations in 1920. In 1924, the company had a working capital of $300,000 and had attracted investors from the east and west coasts of the United States as well as Europe. Relying primarily on copper ore, the company operated a large mine on Lulu Pass until 1925, when the discovery of rich pyritic copper veins at the base of the pass at the headwaters of Fisher Creek, caused the company to concentrate its operations there. In all, the company had 3,100 feet of tunnels with a vertical range of 450 feet distributed among four adits. In 1926, the company, headed by Martin Guenzel of Seattle, constructed a small 25-ton copper smelter at their lower workings to process the low-grade pyritic ore present there. Prior to the completion of the smelter, Glengarry ore was shipped through Yellowstone National Park to a smelter in Butte. The smelter

[314]Livingston Enterprise, 1926. "Cooke Smelters May Be Operated by Natural Gas." July 18, 1926.

equipment was transported to the mines during the winter of 1925-26, a time when mining activity usually ceased because of heavy snow.

The Glengarry Company reached its highest productivity in 1926, when its assets at "Glengarry City" included a small tractor, air drills, machine shop, smelter, blacksmithy and "buildings essential to the maintenance of a small force of men." Ore produced by the mines ran $9 per ton and averaged 30 to 35 percent copper. The collapse of the stock market in 1929 also saw the Glengarry Mining Company's fortunes dwindle. By 1930, activity at the smelter and mines ceased. In the mid 1940s, the reorganized Glengarry Company open-cut mined its Lulu Pass property on Scotch Bonnet Mountain. The property was permanently shut down in 1955.[315]

The Tredennick Development Company owned five patented claims on the southeast flank of Scotch Bonnet Mountain. Nick Tredennick, former mine supervisor of the Republic mine, discovered promising pyritic copper bodies there shortly after World War I and began earnestly developing them in 1922. By 1923, structures at the mine included ore bins, tool shed, blacksmithy, boarding houses and stables. The 1,200 feet of workings were distributed among two adits, one of which was located adjacent to one of the company's boarding houses. By 1929, financial difficulties forced the company to cease operations before the copper ore bodies were reached.[316]

Long-time Cooke City miner Peter Branser also operated a mine on Lulu Pass during the 1920s. Living in a cabin close to the Upper Glengarry Company workings, Branser had apparently worked the Lulu and Contact claims since at least 1912, before filing a claim on the properties in July 1920. Called the Lulu-Contact mine, the workings extended only 400-500 feet underground in 1925. The mine concentrated on copper, gold and silver with the ore processed at Cooke City. Branser died in 1939 without fully developing his mining claims.[317]

Meanwhile, at the Western Smelting and Power Company's operation on Henderson Mountain, tunneling work progressed rapidly on the Homestake and Gold Dust mines as Tanzer continued to generate capital and interest in the company's operations. Development work began on the Gold Dust mine in 1920. Tanzer believed that the mine would strike the ore body then being exploited by the Homestake mine -- 700 feet above the Gold Dust. Tanzer's mining engineers assured him that the lode would be struck approximately 1,000 feet into the mountainside. In anticipation of the strike and the completion of the smelter in 1923, the company began construction of an aerial tram that connected the Homestake mine with the Gold Dust mine and the smelter, almost two miles away. Equipment for the tram arrived in Gardiner in June 1923 and was shipped to Cooke City. When completed in 1925, the aerial tram moved at a speed of twelve miles per hour and could deliver 250 tons of ore to the smelter every six hours. By 1925, however, it became increasingly obvious to company mining engineers and

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[315]Reed, Glenn C., 1950. Mines and Mineral Deposits (Except Fuels), Park County Montana. U.S. Bureau of Mines Information Circular No. 7546. GPO, Washington.

[316]Ibid.

[317]Livingston Enterprise, 1920. "Cooke Smelters May Be Operated by Natural Gas." July 30, 1920

officials that the ore body was nowhere near its projected location. By late summer 1926, the Gold Dust tunnel had reached 2100 feet and had not yet tapped the ore body present in the Homestake. A compressor explosion at the Gold Dust further hampered the operations of the company (they had, by 1925, purchased nearly all the mining claims on Henderson Mountain). Because the ore body had not been tapped, the smelter had not stockpiled any ore and was never put into operation, despite the annual assurances of Tanzer to the Board of Directors and Livingston Enterprise reporters.

With the collapse of the stock market in 1929, the fortunes of the Western Smelting and Power Company proved as elusive as the Homestake mine ore body. In 1929, when the smelter had enough ore to begin operating, Tanzer fled Montana and disappeared, resulting in a complete shutdown in operations at the Gold Dust and Homestake mines. The smelter was allowed to deteriorate, although there was some interest in converting it to a gold and silver mill in the mid 1930s. While mining activities on the company's properties never resumed, the company continued to exist under a variety of names until 1946. It is not currently known whether the activities of the Western Smelting and Power Company was an elaborate "scam", perpetrated by "Doc" Tanzer or, more likely, the company was plagued by bad luck and the uncertainties of the geology in the rugged Beartooth-Absaroka mountain range.[318]

The Third Period (1934-1942)

The third period of significance began around 1928 with the development of open pit operations on Fisher and Henderson Mountains. Only three major mines, the McLaren, Glengarry and Alice E., were worked during this period. Although the last of these mines closed in 1960, the period of historic significance (based upon production and impact on the local economy) ended around 1942, when gold mining was postponed as a nonessential wartime activity, and the labor force turned to the war effort.

Beginning in 1934, the McLaren Gold Mines Company began mining operations at the site of the New Year's Gift Mine on the southwestern flank of Fisher Mountain and built a large smelter to process the ore east of Cooke City. Prior to 1934, only sporadic mining occurred on the mountain and was limited to small open-cuts and a few tunnels. The McLaren Company expanded operations on the mountain to include open-cut and open-pit mining. In 1938, the Newmont Mining Corporation gained control of the New Year's Gift Mine and began an extensive drilling program on Red Mountain. By 1940, the McLaren Company had regained control of the property and became a steady producer of gold and silver ore until 1953, when operations permanently ceased. In the mid- 1940s, equipment at the mine included two gasoline-powered shovels, two gasoline-powered compressors, a wagon drill and jackhammer. Two 15ton Euclid trucks were used to haul ore to the McLaren smelter, three miles away. Mining occurred, as it did historically in the New World district, from May to October. Between 1933 and 1953, 40,000 tons of crude ore was mined and milled annually at the

[318]Glidden, Ralph, 1976. Exploring the Yellowstone High Country: A History of the Cooke City Area. Artcraft Printers, Bozeman.

McLaren properties, producing 60,000 ounces of gold, 17,000 ounces of silver and four million pounds of copper.[319]

Unlike the McLaren mines, little is known of operations occurring at the Upper Glengarry or Como mine from approximately 1940 to 1955. Located on Lulu Pass, the Upper Glengarry mine was worked as a tunnel operation from 1920 to 1927; the Glengarry Mining Company placed emphasis on the lower tunnels. Rich in pyritic copper and gold ore, the site was mined until approximately 1955.[320]

Between 1900 and 1955, the New World mining district produced 65,000 ounces of gold, approximately 500,000 ounces of silver and about 4, 100 short tons of copper, zinc and lead. In the 20th century, the years of highest productivity were 1920-1929 and 1933 to 1955. While a remote and isolated region, the New World district was the third largest producer of precious metals in Montana in 1926.[321]

History of the Republic Mine and Mill

The Great Republic was one of the first major mines developed in the district. Ore from the Republic mine was initially smelted in a small "Mexican" style furnace that was brought into the district in 1877. In 1882 the Republic Smelter was constructed to process the abundant Great Republic Mine ore. However, the ore proved to be too complex for the smelter. Open roasting of the ore was tried without success. A roaster was then added to the smelter. This also proved to be inadequate. A solution was reached in 1885, when Republic ore as combined with the purer Miller Mountain ore in the smelting process. By 1886, 420 tons of bullion from the Republic had been smelted and hauled by wagon to Cinnabar, the terminus of the Northern Pacific Railroad. However the bullion was of such high lead content, the proceeds from its sale failed to pay mining, smelting and transportation costs. The mine superintendent Reuben Rickard proposed a desilvering plant. The silver would then be shipped to market. The lead would be stockpiled as an incentive for the railroad to come to Cooke City. When Republic stockholders could not come up with additional capital to build the desilvering plant, Rickard resigned, forcing the closure of the smelter and Great Republic mine. The property continues to be explored by its current owner.[322]

World Mining District Summary

Soon after the Cooke City area was officially opened to mineral exploration and exploitation by the redrawing of the Crow Indian Reservation in 1882, official claims were made throughout the New World Mining District. Charles W. Hoffman and George Houston filed a notice of location for the Great Republic Lode on April 19, 1882.

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[319]Anderson, Paul, 1985. "Cultural Resource Inventory and Evaluation of the McLaren Mill Site, Cooke City, Montana". Prepared for the Montana Department of State Lands by GCM Services, Inc., Butte.

[320]Lovering, Thomas F., 1929. "The New World or Cooke City Mining District, Park County, Montana",

[321]GCM Services, Inc., 1990. "Cultural Resource Inventory and Assessment: Noranda, Minerals New World Mining Project, Park County, Montana" proposed for Hydrometrics, Inc. by GCM Services, Butte.

[322]Reed, Glenn C., 1950. Mines and Mineral Deposits (Except Fuels), Park County Montana . U.S. Bureau of Mines Information Circular No. 7546. GPO, Washington.

Hoffman and Houston went together with Rosa Black to locate the Greeley Lode on the same day. Soon thereafter, these claims along with the Houston and New World were consolidated under the ownership of George 0. Eaton. Eaton would later gain some fame as the surveyor general for Montana. Eaton sold half interest in his enterprise to Thomas Sturgis and William Lane, two bankers from Cheyenne, Wyoming. The men then incorporated the Republic Mining Company April 30,1883.[323]

In 1883, the company invested $300,000 in improvements on their property in the New World Mining District. The Republic Smelter and an office building were built on the northeast comer of the Greeley Lode and Millsite to process ore from the Great Republic mine. At the recommendations of Clarence King of the United States Geological Society, who happened to be a friend of Sturgis and Lane, the services of Reuben Rickard were obtained as superintendent of the smelter. Operations began in 1884 using charcoal as fuel since neither coal nor coke could be obtained. A trial run in 1883 showed the Republic ores to be too complex for the smelter containing too much antimony, arsenic and zinc. Open roasting of the ore was tried in 1884 with little success. A roasting furnace was added to the smelter in 1885, but it too proved to be inadequate. The smelting process became viable in 1885 when purer Miller Mountain lead-silver ore was smelted with the Republic ore. By 1886, 420 tons of bullion from the Republic were produced and hauled by wagon to Cinnabar, the terminus of the Northern Pacific Railroad. The 4,000 tons of ore smelted in 1886 produced 735,000 pounds of lead, 62,300 ounces of silver and 438 ounces of gold. However the proceeds from its sale failed to pay mining, smelting and transportation costs. Mine superintendent Rickard proposed a desilvering plant to lower transportation charges. The silver would then be shipped to market. The lead would be stockpiled as an incentive for the railroad to come to Cooke City. When Republic stock holders could not come up with additional capital to build the desilvering plant, Rickard resigned, forcing the closure of the smelter and Great Republic mine. While the mine would be worked again twenty years after the closure, the mill would not reopen.[324]

According to local oral sources, concerned citizens to prevent local children from coming to harm burned the mill. This action was said to have occurred near the turn of the century, however, the mill is shown intact in a historic photograph taken of Cooke City sometime after the 1907 when the addition to the Cooke City store was completed. Indeed, western illustrator W. H. D. Koerner in the mid- 1920s drew the smelter. The smelter site was subdivided into four residential sites in 1974. Subsequently, the J. William Smith family erected a cabin on the upper level of the former smelter.[325]

Historical Summary of Jardine Montana
By: Peter L. Steere, Frederic L. Quivik and Paul A. Anderson

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[323]Renewable Technologies, Inc., 1996. "Great Republic Smelter (PA No. 34-000) New World Mining District, Park County, Montana." Prepared for the Abandoned Mines Reclamation Bureau, Department of Environmental Quality.
[324]Swallow, G. C. and J. B. Trevarthen, 1890. Reports of the Inspector of Mines and Deputy Inspector of Mines for the Six Months Ending November 30th. M9. Journal Publishing Company, Helena.
[325]Huckaba, Ralph, 1990. Communication at the Irma Mine, August 18.

Jardine, 1864-1897

The first placer gold discovery in the Upper Yellowstone River Valley occurred in the fall of 1863 at the mouth of Emigrant Gulch. The strike attracted a number of expectant miners who established Yellowstone City (later Emigrant) near the mouth of the gulch the following spring. By August 1864, there were several hundred miners working in Emigrant Gulch and the new camp consisted of over forty crudely built log structures. Returns from the diggings at the mouth of Emigrant Gulch were disappointing and the following spring many of the miners established a second camp farther up Emigrant Gulch. Similar in construction to Yellowstone City, this camp, named Chico, was designated as an official United States Post Office on July 15, 1865. Yet, many of the miners, discouraged by the continually meager prospects in Emigrant Gulch, began working the waters of adjacent streams to the south and north. In May 1866, Joe Brown, who was prospecting along the Yellowstone River, recovered approximately $8,000 worth of gold from an area near the mouth of Bear Creek.[326] Brown's discovery renewed the flagging interest in the gold resources of the Upper Yellowstone Valley. That same year other miners made additional discoveries farther up Bear Creek, at the mouth of a small stream named Crevice Creek.[327]

Placer mining activity continued in the Bear Gulch area until the early 1880s. Brown and several other miners constructed ditches from Bear Creek to work the placer deposits. Also in 1870, Brown and James Graham located gold bearing quartz ore on Mineral Ridge, south of present Jardine, Montana. The mining during this period was retarded, however, by several factors. The placer deposits were relatively insignificant and therefore financially disappointing. Also, despite the discovery of gold ore in 1870, there was little attempt to develop the ore because of a lack of investment capital for the necessary equipment. Moreover, under the terms of the 1851 Fort Laramie Treaty and the 1868 Fort Laramie Treaty, Bear Gulch and all lands east of the Yellowstone River were part of the Crow Indian Reservation. White settlers were prohibited from acquiring lands or mineral patents on the reservation. Although there were undoubtedly violations of the terms of the treaty and there were miners living and working in the area throughout the period, their presence was illegal. None of the placer or lode claims located between 1866 and the early 1880s could be patented until the Crow Tribe agreed to a cession of a portion of their reservation that included the Bear Gulch area. Congress ratified the 1882 cession on April 11, 1882.[328]

For over three decades after Joe Brown made the first significant gold discovery in Bear Creek in 1866, there was relatively little mining activity in the area. Placer miners,

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[326]The "Cultural Resource and Evaluation Project" prepared by Steere, Quivik, and Anderson notes that Brown's discovery amounted to $1,800 worth of gold. HRA uses the figure $8,000 because that was the amount cited by Aubrey L. Haines in The Yellowstone Story, his two-volume work on the history and development of Yellowstone Park. See Aubrey L. Haines, The Yellowstone Story, 2 vols. (Boulder, Colorado: Colorado University Press, 1977), p. 76.

[327]Steere, Quivik and Anderson, "Cultural Resource and Evaluation Project," pp. 30-31; Haines, The Yellowstone Story, pp. 69-81.

[328]Joe Brown and James Graham filed the first mineral claim in the Bear Gulch area on April 18, 1882, seven days after Congress ratified the Crow sale. See Steere, *Quivik* and Anderson, "Cultural Resource Inventory and Evaluation Project," p. 33. The full text of the terms of the Crow sale are contained in Charles J. Kappler (comp.), Indian Affairs, Laws and Treaties, 5 vols. (Washington DC: Government Printing Office, 1904), 1, pp. 195-197.

including Brown and several associates, worked the gravel of Bear Creek and its tributaries until the early 1880s. In 1884, Charles H. Eaton and Thomas Sturgis constructed a five-stamp reduction mill at Bear Gulch camp (the site of present Jardine) in an attempt to recover gold from ore extracted from the nearby hills. The mill operated for less than two years before closing in 1886. Although the mill was reopened in 1890, the national economic depression that struck in 1893 resulted in a cessation of mining activity in that year.

There was a flurry of activity at Bear Gulch in the late 1890s when the Bear Gulch Mining Company proposed to reopen the mines and the stamp mill. Dissension within the company retarded plans for extensive development. Yet, it was during the period from 1898 until the early 1900s that the structural development of the newly named town of Jardine occurred. The Revenue Mill, mine office, guest house, cyanide mill (later converted to an arsenic mill), school house, and a number of residential structures were completed during this period. Also, because of the resurgence in mining activity, a number of businesses, including several hotels, boarding houses, and mercantile establishments, were established in Jardine. By 1908, financial and legal problems ended the brief mining "boom" in Jardine and the Kimberly-Montana Gold Mining and Milling Company closed their entire operation.

The mines and mills at Jardine remained idle until the late 1910s, when the Jardine Gold Mining and Milling Company activated mining operations. This company and its successor, the Jardine Mining Company, conducted the most productive and long-lived mining venture in the community's history. After refitting or renovating existing facilities, the Jardine Mining company, beginning in the early 1920s, initiated a mine development and processing plan that included the production of gold, arsenic, tungsten, and silver. The company operated intermittently from the early 1920s until 1948. Despite periods of inactivity during the late 1920s and early 1930s and from 1942-1943, the Jardine Mining Company's presence in the area provided a measure of job security and permanence for the residents of Jardine heretofore unknown in the community. There were few new additions to the structural complexion of Jardine during the company's tenure, yet many of the existing buildings were renovated extensively, primarily the milling operations.

For over a decade after the mines and mills closed in 1948, the town of Jardine was idle. The mining company anticipated a financial settlement with the federal government and hoped to use any monies retrieved to reopen the mines and mills. The company lost their court battle with the government in the early 1950s and, as a result, the ownership of the town passed to the government.

In 1884 Major Charles H. Eaton and his associate Thomas Sturgis purchased most of the patented mining claims in Bear Gulch. Eaton and Sturgis, who owned the Bear Gulch Placer Company and other mining property in Cooke City, invested the first significant amount of money in the mining operations in Bear Gulch. Sturgis and Eaton financed the first major hydraulic mining operation in Bear Gulch. In addition to constructing the

hydraulic system, Eaton and Sturgis built a small five-stamp mill to reduce the surface ores they recovered in their hydraulic operation. The mill was located near the southern end of the present town of Jardine. Eaton and Sturgis' mining venture was short-lived. The gold recovered using their hydraulic system was negligible, and by 1885 the two partners abandoned their operation in Bear Gulch.[329]

There was little mining activity in Bear Gulch for five years after the Eaton and Sturgis operation closed. There was a brief revival in 1890, when Edgerton & Jewell of Helena, Montana, purchased the Eaton Mill and hydraulic operations. The new owners increased the capacity of the mill from five to ten stamps and processed ores from their nearby claims. The mill operated until 1893, but in that year the owners closed the plant as a result of the national economic depression.[330]

Mining activity in Bear Gulch between the initial discovery in 1866 until Edgerton and Jewell closed the mill in 1893 was very sporadic. There are no production figures available, but most accounts of activity in the region indicate relatively insignificant mineral production. The structural development of the area that later became the town of Jardine is equally vague. The only documented structure during the period is the Eaton Mill that was built in 1884. The mill is no longer standing, but it is visible in photographs of Jardine taken in the late 1890s. Most sources indicate that there were very few buildings in the area until after 1898.[331]

Jardine, 1898-1908

In July of 1898, Harry Bush arrived in Bear Gulch. There had been little mining activity in the small camp since 1893 and the area was virtually deserted. Bush, however, initiated a promotional campaign designed to renew interest in the area's mineral potential. In August 1898, Bush and a number of Canadian and local investors organized the Bear Gulch Mining Company. Bush and his associates were primarily interested in developing the hard rock mines located on Mineral Hill directly east of Bear Gulch. Thus they purchased many of the potential lode mining claims on the hill. Bush also acquired most of the placer claims located along Bear Creek. While he was preparing plans for constructing a large stamp mill, Bush ordered his employees to renovate and expand the Edgerton-Jewell Mill to accommodate an additional ten stamps, two Frue vanners, and three James tables. Also, Bush ordered his men to construct a new ditch to supply water for hydraulic mining on the company's placer claims. In addition to expanding the mining operations in Bear Gulch, Bush began constructing a number of new commercial and residential buildings in the community.

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[329]Steere, *Quivik* and Anderson, "Cultural Resource Inventory and Evaluation Project," p. 33. Figures 9 and 11 in the above-cited report are historic photos illustrating the Eaton operation. Figure 9 is a photograph of the hydraulic system in operation, and Figure 11 is an 1898 photograph of Jardine. The Eaton mill is the large L-shaped building on the extreme right side of the photograph.

[330]Ibid., p. 33.

[331]The Eaton Mill shown in Figure 11 of Steere, Quivik and Anderson's, Cultural Resource Inventory and Evaluation Project" can be compared to Fig. 3-1 of HRA's report. HRA's photograph, obtained from the Montana Historical Society's photographic archives, shows the Eaton Mill after there had been major structural additions to the original mill pictured in Figure 11 of the initial report. 6.

The name of the camp was changed from Bear Gulch to Jardine, in honor of A.C. Jardine, the company secretary and one of the leading Canadian investors.

By the following summer, work on the Revenue Stamp Mill was nearing completion. However, Bush's partners in the Bear Gulch Mining Company, apprehensive about their investments, began criticizing Bush's operation of the company. In June of 1899, after several months of mounting internal dissension, Bush resigned as president of the company. Undaunted, Bush enlisted several new investors and incorporated the Revenue Mining Company and two associated mining companies which included the King Solomon Quartz and Placer Mining Company and the Empire Mining Company. Bush and his partners acquired a number of new mining claims that summer and continued construction of the Revenue Mill. Moreover, Bush underwrote the construction of housing and commercial facilities for the growing town. Bush's dispute with the owners of the Bear Gulch Mining Company escalated during the summer and winter of 1899. The Revenue Mill was completed in December 1899, but the ores extracted from Bush's mines were low grade. Several of the claims that he and his partners had purchased contained rich gold deposits, yet problems with claim jumpers which eventually involved expensive litigation prevented Bush from working these claims. Thus, by early 1900, Bush's financial position was weakening rapidly. He made several attempts to refinance his operations and to attract new investors, but in August 1900, all of his property including the Revenue Mill and several other structures in Jardine were sold to a Butte bank for $60,000. Bush was able to interest several investors from Spokane, Washington, and they formed the Robinson Mining Company. However, the company's tenure in Jardine was brief and, by 1901, Harry Bush left Jardine and never returned.[332]

Mining activity declined for several years after Bush's departure. The Bear Gulch Mining Company continued their mining on a limited scale. Between 1902 and 1904, a newly formed mining company, the Kimberly-Montana Gold Mining and Milling Company, purchased all of the mining property and equipment in Bear Gulch. The company, managed by H.M. Ryan and owned by Peter Kimberly, constructed a large, 150-ton cyanide-leaching plant, installed an air compressor house east of the Revenue Mill, and developed the nearby mines. Despite the large amount of capital invested in the Jardine operation, the Kimberly-Montana Company recovered relatively little high-grade gold ore. Moreover, the company was further hampered by disputes over mining claim ownership, internal dissension, and insufficient capital. Between 1904 and 1909, the company mined an insignificant amount of ore. In 1909, the company went bankrupt and all of the mining property in Jardine was sold in 1913.

The second period of development in Jardine was marked by Harry Bush's intense promotional campaign. Structurally, the floundering placer camp of Bear Gulch evolved into a seemingly thriving mining community. The Revenue Mill, the mine company offices, the schoolhouse, the guesthouse, and a number of residential and commercial buildings were constructed shortly after Bush arrived or soon after his

[332]Steere, Quivik, and Anderson, "Cultural Resource Inventory and Evaluation Project," pp. 43-55.

departure in 1901. In addition, the Kimberly-Montana Gold Mining and Milling Company constructed additional buildings, including a large cyanide plant. Yet, Jardine's mineral production during the period was disappointing and financial failure for promoters and investors alike resulted. The miners who worked for the different mining companies rented from mine owners, as did most businessmen. Jardine was a company-owned town but the various companies continually faced financial insolvency for a variety of reasons.

Jardine, 1909-1948

Although gold was the mineral that initially attracted miners to the Jardine area, the deposits of tungsten (scheelite) ore and arsenic, a byproduct of the milling operation, proved to be the most valuable products from the Jardine mines. Until the early 1900s, the miners in Jardine discarded the scheelite because they were unable to extract the gold from the dense ore. In 1905, a mine superintendent working for the Kimberly-Montana Gold Mining and Milling Company identified the scheelite as a valuable mineral. Several hundred tons of the ore were shipped to refineries in 1907 but the Kimberly-Montana Company never produced significant amounts. It was not until the 1920s that either the scheelite ores or arsenic featured prominently in Jardine mining.

In 1914, the Arizona-based Jardine Gold Mining and Milling Company purchased the town of Jardine, including all mining and milling equipment. The company spent three years resolving legal disputes over claim ownership and water rights. In 1917, Harry C. Bacorn and W.S. Hunnewell, who had acquired a lease on the Jardine mines and mills from the Jardine Gold Mining and Milling Company, began a small-scale mining operation. The two men used the Revenue Mill to reduce the ore and recovered free-milling gold using the amalgamation and flotation process. Bacorn did not use the cyanide plant and neither did Hunnewell because the equipment was inoperable. The concentrates obtained after amalgamation and flotation were shipped to smelters in East Helena or Anaconda for further reduction.

In 1921, the Jardine Mining Company, a Montana firm, purchased the Jardine Gold Mining and Milling Company's property in Jardine. Bacorn was appointed vice-president and general manager and, with the infusion-of new capital, he increased production and renovated the Revenue Mill. The renovations included replacing the wooden foundations for each of the forty stamps with concrete and a realignment of the tramway system.

In 1922, the Jardine Mining Company sent a shipment of concentrates to a smelter in Tacoma, Washington. Results from the smelter indicated an unusually high level of pure arsenic oxide (commercial arsenic used in the production of insecticides, glass, and other products). The value of the arsenic in the shipment was valued at over $210,000, double the value of the gold recovered from the shipment. However, the contract between the Jardine Mining Company and the Tacoma Smelter did not require the

smelter to pay for the arsenic recovered since it was considered by most smelters to be a waste product of the refining process. Thus, the Jardine Mining Company did not realize a profit from the arsenic.

Bacorn, who had become vice-president and general manager of the company in 1921, decided to add arsenic-refining equipment to the Jardine operation. He ordered the necessary material and had it installed in the existing cyanide plant. According to a newspaper account of the refitting procedure:

> The old cyanide mill presented a problem to the mine owners, when it was decided to remodel it into an arsenic kitchen. A score or more of big cyanide tanks had to be removed. That, in itself, might not have been much of a task, but every tank was filled with old tailings, which, during the years since the cyanide mill was last used, had hardened almost to the consistency of cement.[333]

The arsenic mill was originally a part of the large, 150-ton cyanide plant constructed by the Kimberly-Montana Gold Mining and Milling Company. That company used the cyanide plant for only a short period of time. The cyanide plant was refitted in 1923 to recover arsenic from the ores at Jardine.

Bacorn ordered his men to dismantle the wooden cyanide tanks. The men then used dynamite to reduce the hardened cyanide to rubble and they hammered the rubble to dust. Rather than remove the remains, the arsenic-roasting equipment and arsenic "kitchens" were placed on the packed cyanide dust.[334]

In 1923, the Jardine Mining Company recovered over 770,000 pounds of arsenic and, by 1926, this figure increased to over 3.7 million pounds. Moreover, the dramatic increase in arsenic production between 1923 and 1926 was paralleled by a significant increase in the recovery of gold. In 1925, the Jardine mines produced over 14,000 ounces of gold, almost double the amount recovered in 1922. The increase was due largely to an increase in the number of tons of ore mined and milled. In 1926, however, production dropped dramatically from a high of over 69,000 tons in 1925 to less than 25,000 tons. The following year, the company was virtually inactive and only 40 tons of ore were produced and treated. The Jardine mines and mills were not reopened until 1930, when approximately 50,000 pounds of tungsten were produced from Jardine ores. Full production at Jardine did not resume, however, until three years later.[335]

In October 1933, the United States began purchasing gold for over $31 an ounce, more than $2 above the world market price. By January 1934, the price had increased to $35 an ounce. This "New Deal" measure, designed to enable the government to control the

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[333] Livingston Enterprise, February 20, 1923.

[334] Ibid.

[335] Steere, Quivik, and Anderson, "Cultural Resource Inventory and Evaluation Project," p. 57; George F. Seager, "Gold, Arsenic, and Tungsten Deposits of the Jardine-Crevasse Mountain District, Park County, Montana," Montana Bureau of Mines and Geology Memoir No. 23, Montana School of Mines, Butte, 1944, pp. 9, 11-12. The reason for the closure of the Jardine mines in 1926-1927 is unknown. It is possible that the drop in the world market price of arsenic that occurred in the mid-1920s contributed to the closure.

gold value of the dollar and thereby increase farm commodity prices, stimulated increased production in Jardine.[336] Over 22,000 tons of ore were produced in that year, compared too less than 3,000 tons in 1932.

In 1936, William H. Hax, who represented the New York investors, became the president and general manager of the Jardine Mining Company. The new owners opened and developed new ore veins. A decline in the price of arsenic in 1936 resulted in the closure of the company's arsenic recovery facilities. Despite the curtailment of arsening refining, ore production levels continued to increase under Hax's direction until the early part of 1942. At that time, wartime restrictions on certain essential operating supplies forced the Jardine Mining Company to close their operations.

By the summer of 1942, only several months after the Jardine operations closed, the federal government began encouraging mining companies to increase production of arsenic. Although the arsenic faculties had been closed in 1936, Jardine Mining Company officials were able to acquire loans in 1943 from the government to renovate the existing plant. Rehabilitation of the mill, which required the installation of some new equipment, was completed in January 1944. The following month, production at the mill commenced on a limited basis but by July, the mill was fully operational. The mill was capable of treating between 150 and 200 tons of arsenic ore daily. The daily recovery of pure arsenic usually exceeded six tons. This level of production continued until late 1945, when the government cancelled their contract with the Jardine Mining Company. Without the guaranteed government contract, the company was unable to repay the federal loans obtained to renovate the arsenic mill. The company reduced their mine, mills operations, and began restoration and enlargement of their cyanide plant, adjacent to the arsenic mill. On May 8, 1848, the day before the cyanide mill was to begin operations, a fire destroyed the structure. In mid-July of that year, the Jardine Mining Company closed all of their facilities.[337]

The federal government filed suit in the late 1940s in an attempt to force repayment of the loans made to the Jardine Mining Company. The company filed a countersuit, charging the federal government with breach of contract and asking for over $2.3 million in damages. A federal claims court ruled, in 1954, that the government had illegally broken their contract with the company. The decision was over-ruled on appeal, however, and the government confiscated the company's properties in Jardine.

In 1964, Richard B. Blankenship purchased the town of Jardine and all mining and milling properties from the federal government at a receivership auction. Blankenship hoped to transform Jardine into a recreation center with facilities including camping for summer visitors to nearby Yellowstone National Park and a ski area and snowmobile trails for winter sport enthusiasts. He began removing or destroying many of the buildings located in the former commercial district. Blankenship owned the property for over a decade, but his plans for building a recreation center never reached fruition.

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[336]William E. Leuchtenburg, Franklin D. Roosevelt and the New Deal: 19321946 (New York: Harper and Row, 1963), pp. 79-82.
[337]Seager, "Gold, Arsenic, and Tungsten Deposits," pp. 9-13.

However, during the time that he owned the town, he destroyed the majority of the southern portion of Jardine.[338]

In the mid-1970s, Blankenship sold his Jardine properties to the Anaconda Copper Mining Company (ACM). ACM did not reopen any of the Jardine mining properties, although they did conduct preliminary tests on the local ore. ACM sold the town of Jardine and the patented mining claims to the present owners, Homestake Mining Company, in the early 1980s.[339]

BACKGROUND HISTORY OF THE STILLWATER COMPLEX
By: GCM

The existence of valuable metal ores in the Stillwater River drainage was probably first known during the late 1860s when Joseph Anderson and Jack V. Nye found gold in the area. The deposits were not developed because the area was inside the Crow Indian reservation and was, therefore off limits to mining activities. In 1882, however, a survey of the reservation by the government showed the area to be outside the reservation. Although Indian agent Henry J. Armstrong maintained the area was still within the reservation, the survey opened the floodgate to white miners who immediately filed mining claims even though jurisdiction of the area remained in doubt. During this period Jack Nye and Jimmy and Jonas Hedges found evidence of copper, nickel and chromium deposits in the Mountain View, Benbow and Initial Creek areas which further stimulated interest in the area.[340]

Serious development of the mining properties started in 1886 when the Stillwater Mining Company (which had been incorporated in 1884); the Minneapolis Mining and Smelting Company; and the Nicollet and Hennepin Mining Company moved into the area. Nye had sold his quartz claims in the Benbow and Initial Creek areas to the Stillwater Mining company in 1885 and by 1886 the other major mining properties in the area had been acquired by one or the other of the three big mining companies.[341]

The town of Nye was also established in 1886 and within a year had a population of 300 to 400 people with six saloons, a store, a commissary, a boarding house, an assay office owned by the Minneapolis Mining and Smelting company, and a small smelter. The town's prosperity was short lived, however, even in a time when boom and bust mining camps were a common occurrence. Shortly after the town was established another government survey determined the town was on Indian lands after all and it was ordered to be evacuated. At this point the Minneapolis Mining Company had invested around $200,000 but the ore that had been mined turned out to be of disappointing

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[338]Mr. and Mrs. Bert Onstott (Gardiner, Montana), to Daniel F. Gallacher, December 13, 1983, Gardiner, Montana; Don Lawson (Butte, Montana), to Daniel F. Gallacher [telephone interview], January 9, 1984, Missoula, Montana.
[339]Steere, Quivik, and Anderson, "Cultural Resource Inventory and Evaluation Project," p. 59.
[340]Czarnanske, Gerald K. and Michael L. Zientek (editors), 1985. The Stillwater Complex, Montana: Geology and Guide. Montana Bureau of Mines and Geology Special Publication 92. Montana College of Mineral Science and Technology, Butte.
[341]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver.

quality. By March of 1889 the town had been abandoned and dismantled. The issue was finally settled the following year when the Crows ceded the land that again legalized mining and claim staking in the Stillwater area.[342]

In 1904 a group of prospectors pooled about six tons of ore from their individual claims and shipped it to Omaha for smelting but the assays did not justify further production. Little further work was done until World War I when claims were staked over most of the area, although none were patented. William Mouat (a nephew of the president of the Minneapolis Mining and Smelting Company) hired Otto Miller of Columbus, Montana to redeem the claims around the Mountain View area. The only production during the war occurred at the Gish property at the far western end of the Stillwater Complex where a few carloads of chromite ore were mined and shipped.[343]

During the 1920s and 1930s some exploratory and development work was undertaken in the Stillwater Complex. In 1925 a favorable report by Vincent D. Perry - who later became president of the Anaconda Minerals Company - encouraged the company to conduct mapping, sampling and drilling in 1937 but the results indicated the ore was not as good as Perry had originally thought. William Mouat persuaded the geology Department at Princeton University to study the area that led to the discovery of the main Chromite seams at the Mountain View. Two years later the U. S. Geological Survey and the U. S. Bureau of Mines began a systematic study under the authority of the Strategic Minerals Act of the Stillwater deposits which included geologic mapping and sampling work.[344]

The onset of World War II encouraged large-scale exploration and development work of the Stillwater Complex's chromite deposits. The almost total dependence on foreign sources for this strategically vital mineral needed to make chromium alloy steels, led the government to take over the Stillwater mining properties. When the German U-boat campaign caused the disruption of the foreign ore shipments, it became imperative to develop domestic sources. The Anaconda Minerals Company was made an agent of the government under the Defense Plant Corporation and was to manage the development of chromite ore within the Complex. The Mouat, Benbow and Gish properties were leased for a 10-year period, the mines were reopened, mills were constructed, and large, modem mining camps at both the Benbow and Mouat mining complexes were built. However, shortly after production got underway in 1943, the program was cancelled. The war, by this point, had turned in favor of the Allies and the sea lanes were reopened to cheaper, higher grade foreign sources of chromite ore. The government had invested over $12 million in the program and although the emergency ended before there was a serious shortage of chromite, the development of the Stillwater Complex could have been crucial to the war effort if foreign supplies had not been resumed.[345]

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[342]Ibid.

[343]Conrow, John M., 1945. Factors Affecting Chromite Production in Montana. De Re Metallica 10(4):3-9, 1820.

[344]Ibid.

[345]Wimmler, N. L., 1948. Investigation of Chromite Deposits of the Stillwater Complex, Stillwater and Sweetgrass Counties, Mont. United States Bureau of Mines Report of Investigations 4368. U.S. Department of the Interior, Washington, D. C.

WHEATLAND
GOLDEN
VALLEY
TREASURE
YELLOWSTONE
BIG HORN
SWEETGRASS
STILL-
WATER
CARBON
PARK
CASTLE MOUNTAINS
MURRAY
MUSSELSHELL
BRIDGER
CRAZY MOUNTAIN
BIG TIMBER CANYON
NORTHEAST SWEETGRASS
NORTH STILLWATER
LIVINGSTON
BOULDER RIVER
YELLOWSTONE RIVER
WEST
STILLWATER
STILLWATER
NATURAL
BRIDGE
NYE
GALLATIN
COWLES
EMIGRANT
INDEPENDENCE
JARDINE-CREVASSE
HORSESHOE
NEW WORLD
SILVER RUN
HELLROARING
CLARK
FORK
Harlowton
Roundup
Ryegate
Hysham
Big Timber
Billings
Hardin
Bozeman
Livingston
Columbus
Red Lodge

Scale of Miles
0 10 20 30

Albers Equal Area Projection,
centered at 109.5 W,
standard parallels at 46 and 48 N.

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99nris494-5 - April 19, 1999

Memoir 15 district - mining district boundary interpreted from MT Bureau of Mines & Geology Memoir No. 15, Plate 1; district numbering is from Sahinen (see NOTES).

New district - located and named by the Abandoned Mine Reclamation Bureau (AMRB), Montana Dept. of State Lands to facilitate mine inventory; new districts are not numbered.

Memoir 15 district boundary not used by the AMRB.

Stream

Highway

County Line

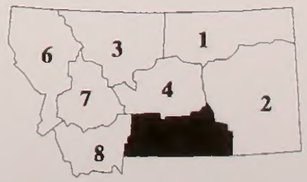
Outside of Region 5

National Forest

National Park

Indian Reservation

Region 5



III - 72 - MAP 5

Following the war, the government cancelled the leases on the Stillwater mining properties and the equipment and mine structures were dismantled or removed. Little mining activity occurred in the Complex for the next few years until another war once again revived mining. In 1952, during the Korean War, the government awarded a contract to the American Chrome Company (a subsidiary of the Goldfield Consolidated Mines Company) to produce 900,000 short tons of concentrate as part of the government's program to stockpile strategic minerals. The American Chrome Company ultimately produced 920,000 tons of concentrate during the period from 1953 until 1961 when the government failed to renew the contract. The government bought the concentrate for $35 per ton and stockpiled it at Nye until 1973 when it was sold to a German company for about $6.70 per ton.

During the 1960s and 1970s the Johns-Manville Corporation conducted some small-scale exploration work for platinum-group elements. The program led to the discovery of the major zone for platinum-group elements - named the J-M Reef. The Anaconda Minerals company also continued to explore the lower areas of the Stillwater Complex from 1966 to 1971 when work was stopped due to metallurgic problems with the ore; increasing environmental requirements and the expropriation of the company's holdings in Chile. In 1977 AMC resumed exploratory work on its properties and developed the 5000-foot long Minneapolis adit in the Mountain View area. In the spring of 1982 an agreement was reached with AMC, Johns-Manville and Chevron Resources Company to form a joint partnership, named the Stillwater Mining Company, for the purpose of conducting exploration and development work in the Stillwater Complex. Additional exploration work was done by Lindgren Exploration Company; Amex Exploration, Inc.; Midwest Oil Company; and Amoco Minerals Company.[346]

REGION 6

Along the western border of Montana from Ravalli County north is region six. It is a mountainous region and has about fifty districts as identified by Abandon Mine Reclamation Bureau in 1994. This region had only two major areas of hard rock mining, and placer mining was more widespread, but not as significant as in other region. In Lincoln County the Sylvanite, Troy and Libby districts had some community development, which is dealt with below. The other area of some significant community development is the area around Cedar Creek and around the town of Superior. This region had other areas such as the area around Clinton, but these areas did not atract the attention of historians yet or were found to posess little or no integritiy. This is the region in which more could be done to expand our contextual understanding of its mining past.

Mining and Settlement In Lincoln County
By: Kootenai National Forest

[346]Czarnanske, Gerald K. and Michael L. Zientek (editors), 1985. The Stillwater Complex, Montana: Geology and Guide. Montana Bureau of Mines and Geology Special Publication 92. Montana College of Mineral Science and Technology, Butte.

Gold was the thing that drew Euroamerican settlers to the Kootenai River Valley. The first major rush to the region started in 1855, with the discoveries around Spokane, Washington, and was known as the Pend Oreille or Coleville Rush. But the real influx of prospectors did not reach western Montana until after the discoveries of the Granville brothers, Stuart and James, at their American Fork ranch in Deerlodge Valley in 1857-1858. By 1862, there was a rush to the Montana mines and boomtowns like Bannack City, Virginia City, and Helena sprang into existence.[347]

In 1863, by various accounts, Benetsee Finley, the half-breed son of the former Northwest trader Jaco Finley, along with Jack Fisher and Joe Ashley, found gold in Wild Horse Creek, a tributary of the Kootenai River not far from the international border in British Columbia.[348] By late summer, 1864, more than a thousand miners were working a four-mile portion of the creek. Most came north out of Idaho and Montana. Supplies were brought in by pack trains from Walla Walla. As the population grew, the Hudson's Bay Company decided to move their trading post from Tobacco Plains to Wild Horse, with Michael Philips in charge.[349] This location would later become the town of Fort Steele.

By 1865, the placers at Wild Horse had begun to play out, and the boom deflated. But it resulted in bringing hundreds of miners to the Kootenai region, and in 1866, a party of prospectors, including Jack Fisher, for whom the Fisher River was named, and Steve Allen discovered gold along Libby Creek. It is Allen who is usually credited for naming Libby Creek after his daughter. There is also a story about how Allen and two other miners were killed by a small band of Kutenai Indians at the Libby diggings.[350] An early settler, John Campbell, reported that he trapped and mined on Fisher River and Libby Creek along with Colin Sinclair and John Fisher, during the winters of 1869-1871.[351]

Apparently, the Libby prospects soon were abandoned, and during the 1870s, this region was basically ignored, being referred to as the "Montana Wilds".[352] In 1885, another gold strike was made at Libby Creek, and a second boom began. The small settlement of log buildings, which sprang up around the placer deposits on lower Libby Creek, was later referred to as "Old Town," and soon boasted fourteen saloons.[353] At the same time the little mining town was established, the Great Northern Railroad was building westward from Havre over Marias Pass, down the Middle Fork of the Flathead River to Columbia Falls and the newly-created town of Kalispell.

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[347] Malone, Michael P., and Richard B. Roeder, 1976. Montana: a history of two centuries. University of *Washington Press*, Seattle.
[348] Johnson, Olga W., 1969. Flathead and Kootenay: the rivers, the tribes, and the region's traders. Northwest Historical Series, 9. Arthur H. Clark Company, Glendale, CA.
[349] Spritzer, Donald E., 1979. Waters of wealth: the story of the Kootenai River and Libby-Dam. Pruett Publishing Company, Boulder, CO.
[350] Ibid.
[351] Campbell, John V., 1915. Letter to Libby Kootenai Times, January 6.
[352] Spritzer, Donald E., 1979. Waters of wealth: the story of the Kootenai River and Libby-Dam. Pruett Publishing Company, Boulder, CO.
[353] Johnson, Olga W., 1969. Flathead and Kootenay: the rivers, the tribes, and the region's traders. Northwest Historical Series, 9. Arthur H. Clark Company, Glendale, CA.

The Great Northern reached the Kootenai River at the same time that the North Star Mine opened north of Fort Steele, British Columbia. Between Jennings, Montana and the North Star, the Kootenai River offered a means of transporting ore to the railhead. In 1891, B. Walter Jones, a former Texas cowboy who had homesteaded at the confluence of the Fisher River with the Kootenai, built a passenger steam boat called the Annerly. Launched the following year, the Annerly, with Captain Harry Depew at the helm, pioneered steam boating on the Kootenai River in Montana. For a brief period, this activity boomed, but in 1898, the Fort Steele excitement had dulled, and the Canadian Pacific's branch line reached the east Kootenay River, enabling the ore to be shipped directly by rail to the smelters.[354]

In the 1890s and early 1900s, mining remained the major industry in this region. Placer mining took place on Libby Creek, West Fisher Creek, the Kootenai River below Rexford, Copeland Creek, and the Kootenai River at Kootenai Falls, Wolf Creek, and Callahan Creek near Troy.[355] Increasingly, however, it was hard rock, or quartz-claims which influenced the development of mining in this region. Some of the earliest quartz mines were located on-Granite Creek and the Fisher River. In 1889, John Abbott, A. F. Dunlap, and Bragg Parmenter, near the town of Libby located the Snowshoe hard rock claim. They leased it to the Chicago and Montana Mining Company, who installed a compressor and sent the ore out by freight teams. In the early 1890s, a mill was erected and an English syndicate, who at one time employed 250 people on three shifts, later acquired the mine.

The mine produced only intermittently after the turn of the century, but by the time it went into receivership in 1912, over a million dollars in gold, silver, and lead had been pulled from it.[356] Near Troy, the Banner and Bangle Mine, later renamed the Snowstorm, was located in 1888. In 1916, a large concentrator was built at the Snowstorm and more than 150 men were employed. A seven-mile electric railway ran between the mine and the mill.

History of the Yahk Area
By: Matthew K. Zweifel

The history of the Yaak Valley begins with mining. Although gold was discovered along the Kootenai River in the 1860s both on the Canadian side and closer to Libby, these early discoveries soon played out. During the 1870s this part of the northwest was known as the "Montana Wilds",[357] and saw little use by whites. In 1885 a second gold strike was made and the town of Libby was born. The town was at first located further south than at present, but moved next to the Kootenai River in 1891 when it was

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[354] Doetch, Bettie, 1976. History of the Kootenai National Forest. Report on file, Supervisor's Office, Kootenai National Forest, Libby, MT.
[355] Johns, Willis M., 1970. Geology and mineral deposits of Lincoln and Flathead Counties, Montana. Montana Bureau of Mines and Geology Bulletin 79.
[356] Ibid.
[357] Spritzer, D. E., 1979. Waters of Wealth: the Story of the Kootenai River and Libby Dam. Pruett Publishing Co., Boulder, Colorado.

realized that the Great Northern Railroad was staying along the river, bypassing the original "Old Town".

This same year construction along the right-of-way for the railroad was begun in Troy. Prior to this Troy was a dying mining town known as Lake City found along Lake Creek, but the railway construction revitalized the town. By fall of 1891 the town had been renamed Troy after the son of a friend of a railroad engineer, and boasted fifteen saloons, a grocery store, two dance halls, and a drug store.

Bill Keeler first discovered gold in the Yaak Valley in 1876. The find, just below Yaak Falls, eventually resulted in a small rush to the area in 1894 and the establishment of a placer mining camp known as Snipetown. Snipetown lasted only about one year before fading away. Up until the late 1800s most of the local mining had been restricted to placer operations. However, in October of 1894 the Troy Times ' reported that the source of the gold found at Snipetown had been discovered about five miles north of the placer operations. Bill Lemley and Pete Berg discovered what they thought was sylvanite, a telluride of silver, at the head of Crawford Creek. They set up the Friday Mine after finding what they really had was gold, but the mine soon pinched out. Their discovery was enough to set off the Sylvanite gold rush.[358]

In 1895 two major claims, the Goldflint and the Keystone, were discovered on Keystone Mountain. At that time it was unclear whether "the Yahk camp", as Sylvanite was then known, was in Montana or Idaho and both states claimed it as their own. A rivalry for the Yahk trade began between Leonia, on the Idaho/Montana line, and Troy, Montana. In July of 1895 work was begun on a free ferry across the Kootenai River at Troy to attract the Yahk trade, and by August the ferry was in service. The Troy Times was full of news of the "Yellow yahk", and predicted there would be 1000 men in camp by the time snow flew. Such was the rush that the Times reported "...if you're looking for someone, and can't find *him, go to the Yahk" (July 1895). The name Lemleyburg was proposed for the Yahk camp in honor of one of the discoverers of the local gold, but this name never stuck. Instead, "Sylvanite" begins to appear in news stories of the day being used interchangeably with "the Yahk camp".

In 1896 a wagon road was cut through from Leonia to Sylvanite.[359] The boom was in full swing, and the Coeur d'Alene Press (February 1896) reported that "loose change was plentiful among the boys." Pack trains were leaving for "the new town of Sylvanite" from both Troy and Leonia, and the rivalry between these two towns was growing. In March of 1896 the Kootenai Herald, a Bonners Ferry, Idaho newspaper, reported that Mr. Ed Riley was going to Sylvanite to start a saloon. The article states that Mr. Riley and a partner, "like all good Trojans", believed that the Troy route to Sylvanite was "the best and we allowed them to depart (Bonners Ferry) under the harmless delusion. " Several articles from local newspapers of the day call for official surveys of the state line

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[358] Doetch, B., 1976. History of the Kootenai National Forest. Report on file at the Supervisor's Office, Kootenai National Forest, Libby, Montana.

[359] Calvi, J., 1993. Trails and Roads to Sylvanite and the Yahk Mining District 1864-1897. Three Rivers Ranger District, Kootenai National Forest, Troy, Montana.

to determine where the Yahk camp really lay. In May the Helena Weekly Herald stated that Sylvanite had a hotel, saloon, grocery store, feed stable, and a general merchandise store. "Jimmy, the Nibbler" was in town trying to start a restaurant. Ten buildings were ready for occupancy and more were under construction. By April a Dr. Sealey had bought a business lot and was planning to "cover the field in the new camp with a stock of drugs".[360]

The site of the new town was platted on the Evergreen Placer Co. claim. The Kootenai Herald, in Bonners Ferry, called it "practically a townsite and the embryo town of Sylvanite will be built upon it".[361] $25.00 bought the businessman or prospector a ten-year lease on a 30 X 100-foot lot. It was noted that "No jumping will be tolerated in Sylvanite". A PostMaster was commissioned for the new town in May. A ten-stamp mill was ordered for the Keystone, and prospects were considered so good that capitalists from Texas came to the Yahk in December looking at investment potential. In the summer Sylvanite had been given a taste of things to come. Forest fires were raging in the Yahk and Bull River Valleys, and were also reported between Libby and Troy. One fire almost burned Sylvanite. Some of the new buildings were scorched, but frantic work by camp residents saved the town.

News from 1897 tells of the stagecoach that ran between Leonia and Sylvanite, and notes that the grade on the Leonia-Sylvanite road had been improved. The Troy-Sylvanite Road was completed, running up the east side of the Yaak River and crossing a wooden bridge just below Yaak Falls near the former Snipetown. In April the Keystone "shipped another gold brick ... valued at $3500".[362] By August there were 200 men on the payroll in Sylvanite, and the Sylvanite Miner newspaper was about to go to press for the first time.

On April 2 of 1898 the Coeur d'Alene Press reported that Sylvanite had 600 inhabitants, graded roads, a large number of frame buildings better than those found in most small towns, and five hotels, one of which stood three stories. By this time the town also sported several saloons, three grocery stores, general merchandise stores, an assay office, a bowling alley, and a brewery. Sylvanite even boasted daily mail service, run between Leonia and Sylvanite on horseback by Jim Stonechest. Although things seemed to be going as well as possible, Sylvanite was indeed a boomtown. By August the Kootenai Herald reported that Sylvanite was nearly deserted. Both the Keystone and the Goldflint were closed down, and the Herald lamented the passing of the Sylvanite Miner. In 1899 there were only two men employed at the Keystone and property forfeitures were being published in the Kootenai Herald. In 1900 the Libby News reported that Sylvanite had been abandoned for 18 months. However, hopes were still high, for in the same issue it states that a 100-stamp mill was planned for the area, and that construction was to start in 60 days. These hopes never materialized into anything substantial, and the town lay virtually abandoned for the next decade.

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[360] Troy Times, April 1896.
[361] Kootenai Herald, May 2, 1896.
[362] Ibid., April 10, 1897.

Sylvanite, although quieter than many boomtowns, lived up to the reputed character of the frontier mining town in many respects. Most of the early miners were rough, single men who swarmed into the region on rumors of gold. The only existing photograph of Sylvanite shows the front of a log saloon with 21 men, four dogs, and one woman posing for the picture. In frontier mining camps organized law was generally a long way off, and disputes were handled either on a personal or ad-hoc basis. A.H. Jory, the manager of the Keystone, was accused in 1896 of claim jumping, and was quickly tried by a board of hastily appointed officials from Leonia. As reported in the Kootenai Herald of January 25, 1896, the court decided that "...the climate on the Yahk may become too warm, even in the dead of winter, to make it a congenial stopping place for Jory. " The early reports of the gold boom also drew an influx of women who "were the types of gals who dug their gold from men's pockets".[363]

When Sylvanite was only a few months old, the Kootenai Herald (May 16, 1896) reported a gunfight over townsite property, but the particulars of the exchange were not known at the time. A long-time Yaak resident reported that three men died on a single evening in a Sylvanite tavern, the result of a fight over a woman.[364] It has also been reported that four men died in a dance hall fight,[365] but this may be the same story as related by a different source. "Wild Bill" Waters of the Yahk country who hung himself in a Colfax, Washington jail after being arrested for selling liquor to Indians.[366] In 1898 Pat Doran was shot by an ex-employee, but managed to walk the three miles back to town for medical attention.[367] In 1908, after Sylvanite had been abandoned, two men used the ghost town to stash $40,000 from a train robbery near Rexford. Suspicion was aroused during a wild spending spree in which the pair proceeded to "paint Bonners Ferry red", and they were arrested shortly thereafter. They promptly escaped, but one of the robbers was recaptured in Minnesota two years later. The second was never seen again.[368]

Although there were numerous claims and mines in the Sylvanite area, the Keystone and the Goldflint claims were by far the most successful. In the fall of 1895 work started on the Keystone with a crew of six men. By 1897 the Keystone employed 20 men and was operating a ten-stamp mill. The Goldflint was growing as well, and by 1898 was running a twenty-stamp mill, employed 33 men; and had a tramway constructed down the hill to a local sawmill. Most of the ore extracted was free-milling gold taken from thousands of feet of tunnels, shafts, and drifts, although there was at least one copper and one lead mine as well.

At least 18 claims were filed in 1895, at least 78 in 1896, 105 in 1897, 11 in 1898, and 13 in 1899. The names of area claims were as varied as the miners themselves, and often gave some indication of what was on the their minds when the claims were discovered and

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[363] Turner, S., n.d. Yakkers. Ms. on file at Montana State Historical Society Archives, Helena, as cited in Friedman et. al. 1983.
[364] Grush, G., 1985. Personal Communication, as related to Jim Calvi.
[365] Wickes, H.V., 1931. Uncited newspaper article provided by the Historical Society of Montana, Helena, under the heading "Ghost town, Sylvanite."
[366] Troy Times, August, 1896.
[367] Sylvanite Miner, September 1, 1898.
[368] Libby Herald, September 7, 1911.

filed. A sample of area claims filed between 1895 and 1899 include the Woodrat, Last Chance, Julietta, Jim Hill, Yankee Girl, Kootenai, Kokanee, Romeo, Gold Queen, Northern Belle, Paradise Placer, Lillian, Little Bonanza, Isis, Red Dog, Minne Ha Ha Placer, Lady Monterey, Iron Mask, Katiedid, Golden Gate, Hoodoo, Della Fox, Beaver Swamp Placer, As You Like It, Bloomer Girl, Chickadee, Florence, Common Sense, Hustler Placer, Pay Streak, Queen of the Hills, Shoo Fly, and the Bobtail. Mines and claims were also found elsewhere in the Yahk. The Black Diamond mine was established on Pine Creek, and there were also placer mining operations on the East Fork Yaak River.

By 1900 the dreams of the first wave of prospectors had vanished; the area mines, including the merged Goldflint and Keystone claims, had shut down and Sylvanite was virtually abandoned. For ten years there was no recorded mining activity around Sylvanite, but in 1910 a group of Canadian investors re-bonded the Keystone and Goldflint claims as the Lincoln Mining Co. and began major improvements. By March there were 15 men employed and the foundations for the new stamp mill were complete. A freight line was operating between Troy and Sylvanite and a general store was about to open.

In April a second general store was opening, work was available for anyone who wanted it, and Western News called Sylvanite the fastest growing town in the county.[369] In May the new Sylvanite Post Office was commissioned, a telephone line was under construction to link Troy and Sylvanite, and the Troy Herald called for a public school for Sylvanite.[370] The first forest fires of the season were also reported in May.

By early June the new 200 ton mill was almost complete, and was fed from the mines almost a half mile up the mountain by a 2400-foot tramway. Ranger Henry Weidner moved into the new Ranger Station one-mile north of Sylvanite and the Sylvanite Post Office was ready to open. The new phone line to Troy was ready for connection. On the 23rd of June the stamp mill went into production, and the pounding of the stamps once again reverberated up and down the valley. By the end of the month the Lincoln Social Club was organized in Sylvanite, The "Sylvanite Club" was opened, the phone line was completed and in service, and Sylvanite held its first church service. Reports of forest fires raging through the mines and town of Kellog, Idaho, and the deaths of several firefighters were covered in the local papers.

Within a month it was decided to double the size of the stamp mill, and the appropriate materials were ordered. The Palace Store, specializing in mining supplies, was running ads in the Troy Herald. Frank Baggs was elected mayor of Sylvanite. Through July and into August Sylvanite kept booming, despite a small forest fire north of town and another fire in the Sylvanite Townsite Co. office. Concentrate from the mill was being shipped to Leonia via a four-horse freight operation. The Lincoln Mining Co. was

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[369]Western News, April 7, 1900.
[370]Troy Herald, May 27, 1900.

calling for workers, and giving preference to married men in an effort to bring in families.

The Western News of August 18th, 1910 ran stories on the forest fires raging on various areas of the Kootenai National Forest, and noted several along the trail between Libby and Troy. These were all reported extinguished or under control, and no great fear was seen for the Yahk in general. Other fires were burning in the Bull River Valley and encroaching on several area homesteads. Shortly thereafter a fire began in Seventeen-Mile Creek, about two miles south of Sylvanite. Fanned by gale-force winds it quickly moved up the Yahk Valley towards Sylvanite. On Saturday night, August 19th, the women and children were sent back to Troy for safety, and on Sunday morning Sylvanite burned to the ground. A few possessions were saved by burying them just before the fire hit, but all else was lost. The only insurance in town was for $1000, held by the Western Mercantile Co. The Keystone hill was swept completely clean, and one of the loaded tram carts lay buried in the ash and debris halfway down the hill where it crashed at the height of the fire storm. The fire was so fierce that it appeared to observers that the entire town of Sylvanite ignited almost at once. The only structure left standing, according to Gene Grush, a fire fighter brought in to help battle the flames, was the Wales Building, known as the "old City Hotel". Apparently that structure housed a large amount of liquor, so "...the boys fought like Hell to save it."[371]

For the next few days fires raged over much of the Kootenai River region. Fires in the Lake Creek area south of Troy swept northward, and 200 firefighters were on line around the town. Local homesteaders were pouring into Troy and Libby, leaving the charred remnants of their ranches behind them. A Mr. Powell, looking back towards his homestead from a fireline he was working about four miles from his home, saw that it too was burning. Racing back along Keeler Creek he passed six black bear and a deer cowering in the stream with singed hair. By the time he got home, as reported in the Troy Herald, "Everything was leveled, house and outbuildings, here a cow, there a pig, yonder a chicken- everything in smoking, smoldering ruins- even the faithful dog and pussy cat burned to a crisp. " From there he raced into Troy to find that his wife and family had arrived safely only hours before.[372]

At one time the total fire front was seventeen miles long and as many as 500 men were on the fire line in the Troy area. Firefighters were being sent in from as far away as Spokane, but the problem was not a lack of manpower, rather the tinder-dry forest conditions and raging winds. Reports reached Libby that Troy was in imminent peril, and one report came through that the town had actually burned. Troy was lucky though, and somehow escaped unharmed. Overall, the Troy and Yahk areas fared better than some surrounding areas. Although tens of thousands of acres of timber and dozens of homesteads burned and some settlers died, it didn't compare to the damage in neighboring Idaho where at least 74 firefighters lost their lives.

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[371] Grush, G., 1985. Personal Communication, as related to Jim Calvi.

[372] Troy Herald August 26, 1910,

The new telephone system that connected Troy with Sylvanite and the Bull Lake Valley was praised. It allowed previously unheard of speed of communication, and undoubtedly saved many lives in the countryside surrounding Troy and Libby. The last call out of Sylvanite came on the Sunday morning minutes before the town burned, but the telephone apparatus was saved by Ranger Weidner and brought down to the Yahk Falls bridge. Here the Ranger and his fire crew made a stand and managed to save the bridge from destruction. The telephone was reconnected at this point so that information on the Yahk fire situation could be relayed directly to Troy. It was noted by Stanley Wood that it appeared the wire had been deliberately cut between Troy and Sylvanite, rather than having been broken by fire or a falling tree. Frank Baggs also suggested that the Yahk fire that destroyed Sylvanite was incendiary in origin, but these allegations were never proved.

Sylvanite never fully recovered as an active mining center. Talk of rebuilding Sylvanite began immediately following the fire, and one article in the Libby Herald, states that work on the new mill was in progress.[373] Rumors of reconstruction continued through 1911, but apparently it was never more than just speculation. In March of 1912 papers were served against the Lincoln Mining Co. and Sylvanite's second and final boom came to a close.

Some of the mines were reopened in the early 1930s, but little historical information is available concerning this time period. Several structures were rebuilt, including bunkhouses, residences, a blacksmith or machine shop, and the mine owners' house, but these were centered around the Keystone and Goldflint claims rather than in Sylvanite proper. A stamp mill was moved in from the Salmon River, Idaho, area and put into operation just below the primary mine portal. Between 1931 and 1937 approximately $246,000 worth of ore was removed from the mines. Apparently this was not enough to create a third, more lasting boom, and by the late 1930s they had shut down again. Sporadic attempts at continued operations were made after the Second World War, but the last mill closed operations permanently in 1951. Other mining ventures crop up occasionally in the Sylvanite area, but they are generally small and short-lived.

Although roads into Sylvanite were constructed in the late 1890s, the upper Yaak was not readily accessible for several more years. By 1912 there was a trail that ran from Eureka into the upper end of the Yaak Valley and all the way to Red Top Creek. A second trail ran from Libby, up Pipe Creek, and north along the South Fork of the Yaak to its confluence with the Yaak River. In 1915 the Eureka trail was upgraded to a very marginal wagon road that led to South Fork, but the trail to Sylvanite from the north was still quite rude. Cabins were constructed at several locations along the Eureka road because it was not possible to travel the entire length in a single day. One such cabin was found at Dodge Summit, along the divide between the upper Yaak Valley and the Kootenai River. It wasn't until 1918 that construction began on a road connecting the

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[373] Libby Herald May, 1911,

upper Yaak with Sylvanite. By 1926 an improved road ran all the way from Sylvanite to Rexford.

The Yaak was marginal ranching and farming ground at best, and most of the early settlers relied on a variety of incomes in order to survive. There are numerous trapper's cabins found throughout the area, evidence of the important part trapping played for many of the early settlers. Many homesteaders turned to logging on their holdings, and in the early 1900s log drives down the Yaak and into the Kootenai River were common. These logs would eventually end up in the sawmill at Bonners Ferry, Idaho. Many of the homesteaders worked for the young Forest Service as packers, fire chasers, and trail blazers. Small-scale mining continued to provide some income to certain individuals, but aside from the small revitalization of the Sylvanite mines in the 1930s, this continued mining had little influence on the local economy.

OVERVIEW OF WESTERN MONTANA MINING HISTORY

By: Timothy F. Light & Mary C. Horstman

The scenes of Montana's last major gold rush, the Cedar Creek placers were discovered in the fall of 1869. By January 1870, a sizeable stampede to the area was underway. While some sources estimate that as many as 10,000 prospectors moved through Cedar Creek within a year of its discovery, it appears that the district's population peaked in the spring and summer of 1870 at around 4,000 people, including large contingents of French-Canadian and Chinese miners. At Cedar Creek, as everywhere on the mining frontier, the gold hunter's pattern repeated itself. Latecomers who found all the good ground staked, miners whose claims played out, and those who believed that richer diggings lay elsewhere, moved from Cedar Creek into surrounding valleys in search of new discoveries. These explorations resulted in a number of small but paying gold strikes, and the establishment of other mining districts in adjoining watersheds, including Trout, Sunrise, Meadow, and Quartz Creeks, and the Ninemile Valley. By 1874, the gold rush era had ended in the area, with most of the placer deposits in these watersheds either worked out and abandoned, or under development by companies using larger scale mining methods.

After the initial placer boom of the early 1870s, mining in Cedar Creek and its neighboring drainages settled into a pattern of relatively steady, moderate production. While the area's mineral wealth never approached the famous (but relatively short-lived) bonanzas of Alder Gulch, Grasshopper Creek or Last Chance Gulch, the Cedar Creek deposits did sustain nearly a century of steady small-to-medium scale mining activity, both placer and hard-rock. The major product was gold, although some silver was produced and the Amador mine was a significant copper source from 1909 through 1920.

The hard times of the 1930s and a 70% increase in the government's fixed price of gold led to a resurgence of placer mining throughout the West, and the Cedar Creek area was no exception. The Depression-era placer boom took the form of numerous

small-scale operations--subsistence mining--that provided wages but not wealth. These subsistence miners often "lived off the land", taking deer and other wild game as needed, with the tacit approval of local authorities.[374] State and federal mining bureaus encouraged small placer operations by providing training in placer mining methods and by publishing informational literature for would-be miners. According to local sources, hundreds of otherwise unemployed people tried their hand at mining in the Cedar, Trout, Meadow, Sunrise, and Quartz watersheds during the Depression. The placer boom of the Thirties waned with the onset of wartime manpower demands and the rationing of such essentials as gasoline, oil and tires. In 1942, the War Production Board issued Order L-208, banning nearly all gold and silver mining as non-essential. In effect for the duration of the war, L-208 presumably shut down most of the region's small mining operations. However, some miners remained on their claims, getting along by hunting, fishing and trapping.

Although the initial exploration of placer deposits along Cedar and Quartz Creek involved the use of basic placer techniques, Cedar Creek's deep gravel depths, the competition for available water, and the expense of ditch and flume construction necessary for ground-sluicing, all combined to make drift-mining the preferred method of mine development during the early 1870s. Drift mining is similar to hardrock mining in that a tunnel or shaft is sunk into the mineral deposit. However, in drifting, the excavated material is hoisted to the surface and washed like other gravels. In some drift mines, explosives were used to break up the deposit, rendering it workable by the usual placer methods.[375] Although largely supplanted by other methods in the 1880s and 1890s, drift mining continued in the Cedar Creek area well into the 1930s.

As the easily worked surface placers played out and the number of miners in the Cedar Creek diggings declined, many of those remaining turned to ground-sluicing by the mid-1870s. By means of ditches and/or flumes, miners directed the flow of water directly over or against a gravel deposit, causing the current to excavate the placer material and carry it into riffled sluices, where the gold was recovered. Frequently dams and reservoirs were constructed to provide a more reliable water supply. Such construction projects involved a considerably greater commitment of time, money and labor than most hand shoveling or drifting operations. As a result, miners who engaged in ground sluicing frequently combined in companies to share both costs and labor. Although ground-sluicing generally occurred where placer deposits were substantial enough to warrant the investment, it was by no means limited to major Mining areas. Ground sluicing began at Cedar Creek in 1871 and by 1873 it was common throughout Cedar, Trout, Sunrise, Meadow, and Quartz Creek drainages.[376]

Construction of ditches, flumes, and reservoirs for ground sluicing in the mid-1870s also enabled Cedar Creek miners to employ hydraulic mining technology. Developed in California during the 1850s. Hydraulicking involved the blasting away of placer

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[374]Timothy Light and Gary D. Williams, Duplice Historic District. Data Recovery Project, Yaak River, Montana. Prepared for US Department of Transportation by Heritage Research Center, Missoula, Montana, 44-45, 91-92.
[375]Thrush, 515; Gardner & Johnson, Placer Mining, Part 1, 47.
[376]Gardner & Johnson, Placer Mining, Part 1, 47.

deposits by water discharged at high pressure from nozzles attached to pipelines or canvas hose. Hydraulic mining was practiced in Cedar Creek and neighboring watersheds until 1972.

Beginning in 1909, Cedar Creek was the scene of extensive dredging near Forest City. Unlike so-called dragline and dry-land dredges, the Cedar Creek operation featured a true floating dredge with both excavating and washing equipment mounted on a floating hull (Bureau of Mines Information Circular 6786). It was a "bucket dredge", the only type used successfully in the United States, which excavated "by means of an endless chain of buckets, screen (ed) and washe (d) the gravel, recover(ed) the gold in sluices, and discharge(d) the waste material into the water behind the boat." Such dredges were active in many Montana mining districts as early as the 1890s. The effects of dredging are highly visible at Alder Gulch, Gold Creek, and Bearmouth, as well as Cedar Creek. The Cedar Creek dredge operated until c. 1916, when the equipment was removed.

Power excavation came into its own as a mining method during the 1920s and 1930s. Bulldozers, backhoes, power shovels, draglines and a variety of other heavy equipment found use in placer mining. Such machinery greatly increased the quantity of gravel that could be treated in a single mining operation, as did the advent of power-driven screening and washing plants such as the so-called "land dredge." Because greater quantities of material could be processed, lower grade deposits could be operated more profitably. Power excavation methods were in use on Cedar, Quartz, and Meadow Creeks by the mid-1930s. Abandoned draglines and shovels are still visible at Big Flat on Oregon Creek and the Big Nugget site on Meadow Creek.

Placer mining along Cedar, Trout, Sunrise, Meadow, and Quartz Creeks, as elsewhere, resulted in sediments and small gravels being carried off by wastewater to the nearest stream or to the mine's dump or settling basin. Larger cobbles and boulders were removed from flumes and working areas by hand, resulting in the distinctive rock piles that mark placer diggings. These often parallel the course of flumes and sluiceboxes, or mark the outlet of a tailrace. In many places, miners incorporated waste rock into the placer's ditches or diversion system, as attested by dry walls of carefully hand-laid rock like those still visible at Tucker Gulch (Quartz Creek) and Smith Gulch (Meadow Creek). Boulders too large to be moved by hand usually were hoisted and set aside by derricks, forming impressive boulder piles. Derricks are known to have operated at placers on Cedar, Trout, and Quartz Creeks. Hardrock or lode mining also occurred in the Cedar, Trout, and Quartz Creek drainages.

MINING IN THE CEDAR CREEK DISTRICT

With the discovery of gold at Moose Creek on the North Fork of the Clearwater River in 1862, and the completion of the Mullan Road along the St. Regis and Clark Fork Rivers the same year, traffic increased over the rugged trails connecting the Clearwater and Clark Fork River watersheds. The route from Moose Creek to the Mullan Road followed part of the present-day Stateline Trail along the Montana-Idaho divide. In

doing so, it skirted the headwaters of four small tributaries of the middle Clark Fork River, Quartz Creek, Meadow Creek, Sunrise Creek, and Cedar Creek before descending along a ridge to the Clark Fork River and Mullan Road. In 1868, prospector Louis A. Barrette traveled this route from Moose Creek to winter with his fellow French Canadians at Frenchtown, a small settlement fifteen miles west of Missoula. En route, he noted the densely wooded basins of the Cedar Creek watershed and determined to prospect the area the following year. In the fall of 1869, Barrette and his partner Basile Lanthier uncovered substantial placer deposits on the creek about eight miles from its mouth." Their discovery and the resulting stampede initiated a history of mining activity on Cedar Creek and neighboring watersheds that has continued nearly without interruption to the present time. Within this 126-year timespan, three periods of significance have been identified: the stampede and early placer era (1,869-1876); an era of increasing mechanization in mining, encompassing extensive ground-sluicing and hydraulic mining, the operation of a floating dredge, hardrock mines, mills, a small smelter and a mine railway (1885-1940); and the Depression-era placer boom (1930-1941).

First Period of Significance: The Cedar Creek Stampede and Early Placer Era, 1869-1876

In spite of Barrette's efforts to keep his Cedar Creek gold discovery quiet, word of the find spread quickly through the close-knit French-Canadian community of Frenchtown and the middle Clark Fork Valley. The first wave of prospectors, nearly all French Canadians, arrived at Cedar Creek on December 1, 1869. Within a few days, most of the immediate area along Cedar Creek and neighboring gulches had been taken up in claims, and a mining district was established. Among those present at the organization of the district were Louis Barrette, Basile Lanthier, Adolphe Lozeau, Joseph E. Marion, C. Bourassa, A. Senecal, J.S. Mead, G. Gagnon, 1. Bourque, J.B. Rouche, C. Lamoureaux, W. Muirheae, J. Laderoute, M. Duquette, R. Grierson, P. Cyr, A. Gervais, 0. Bergeron, F. Bursiere, Edmond Lamoureaux, Charles Dube, Louis Beaupre, T.J. Demers, Edmond Hamel, Hank Froach, Theodore Bedard, W. Dubreuil, "Old" Louis Brown, J.R. Latimer, and R. McGregor Baird.[377] Named in honor of its discoverer, the Barrette. district was a ten-mile square that had as its northern boundary a an east-west line roughly one mile south of the junction of Cedar Creek and Oregon Gulch.[378] The miners elected Joseph Marion as district recorder. A French Canadian, Marion had previously worked for the American Fur Company on the Upper Missouri, and had mined in Colorado, the Canadian Kootenay, and Montana's Alder Gulch. Marion Gulch, now called Mary Ann Gulch, was named for him.[379]

Within a week, gold hunters from camps throughout Montana Territory swarmed to the new diggings. By Christmas a second district had been organized. Named the

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[377]New Northwest, December 10, 1869; Rocky Mountain Gazette, January 22, 1870; Deborah J. Davis, Gumboot Gamblers: Tales of the Cedar Creek Gold Rush (Superior, MT: Mineral County Museum and Historical Society, 1987), 10-11.
[378]New Northwest December 24, 1869.
[379]Michael A. Leeson, History of Montana: 1739-1885, (Chicago: Warner, Beers and Company, 1885), 1312; Rocky Mountain Gazette, January 22, 1870.

O'Keeffe district, its boundaries encompassed the area from the Barrette district boundary north to the mouth of Cedar Creek, including Oregon Gulch.[380] The creation and naming of the new district may have had some connection to a dispute between the French Canadians of the Barrette district and a large contingent of Irish prospectors from Beartown, a mining camp east of Missoula. The Beartowners, who arrived on Cedar Creek in mid-December, objected to certain aspects of the Barette district's mining law and the disagreement nearly resulted in violence, but for the intervention of the highly respected Hugh O'Neil. (A sometime prizefighter, O'Neil had fought Con Orem to a legendary 185-round draw in Virginia City, M.T. in 1865.)[381] In early 1870, two additional mining districts were organized on Cedar Creek: the Sweeney district, in the vicinity of Lost Creek on Oregon Gulch, and the Summit district which encompassed Snowshoe and California Gulches at the head of Cedar Creek.[382]

Not content to wait until spring, dozens of prospectors snowshoed over mountain trails from the Moose Creek and Clearwater camps in Idaho Territory, or over the Mullan Road from Walla Walla or Helena.',, With the spring thaw, these numbers increased dramatically, particularly on the Mullan Road. While the Road provided a relatively easy route along the north side of the Clark Fork, it still remained for Cedar Creek-bound travelers to cross the river and make their way up the Creek's narrow, forested canyons to the diggings. Many of the early prospectors coming from the east by way of Missoula and Frenchtown crossed the Clark Fork at Moose Creek Ferry, some 20 miles west of Frenchtown, following a rough trail along the south side of the River to Cedar Creek.[383] Others remained on the Mullan Road, using any of several crossings between the Lozeau ranch and the influx of Cedar Creek. Travelers eastward from the Walla Walla end of the Mullan Road forged a trail along the southside of the Clark Fork from the St. Regis River to Cedar Creek. To capitalize on the crossing traffic, two competing ferries were established in the vicinity of Cedar Creek in early 1870, one operated by a French Canadian, C. Bourassa, and the other by an Irishman, J. Booth. The two ferries soon consolidated, charging $1.50 for a single horse and rider and $1.00 for pack animals. Angered by the "Monopoly" ferry's rates, the merchants serving the new mining district took measures to provide alternative routes. In the spring of 1870, the rough trails along the south side of the river were improved to accommodate pack trains and freight wagons. In April a group of merchants and freighters consisting of Frank B. Decker, J.S. Mead, William McWhirk, and Edward F. Warren incorporated the Missoula Wagon Road Company to construct a toll wagon road along the south side of the river from the mouth of Cedar Creek to connect with the Mullan Road at the mouth of the St. Regis River. The following month Judge James Gallagher of the Gallatin Valley and Thomas P. Ames began construction of a second south-side toll road to connect Cedar Creek with the Moose Creek Ferry. Known as the Ames Road, it ran across the mouths of Fish, Quartz, Trout and smaller streams, intersecting with the trail up Cedar Creek about one mile above its mouth.[384]

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[380]New Northwest December 31, 1869.
[381]Rocky Mountain Gazette January 22, 1870.
[382]Helena Daily Herald February 19, 1870; February 24, 1870; March 7, 1870.
[383]New Northwest December 31, 1869.
[384]New Northwest March 14, 1870; March 25, 1870; April 15, 1870; July 1, 1870; July 19, 1870; Helena Daily Herald March 28, 1870.

For those traveling to the Cedar Creek diggings, the fifteen-mile trail up the Creek itself was the most difficult and dangerous part of the journey. The early stampeders had beaten a passable trail from the Mouth of Cedar to Oregon Gulch. There prospectors had to leave their stock, continuing to the Barrette diggings on foot some four miles through dense forest and underbrush along a steep slope some 100-200 feet above the east bank of the creek. Even after the trail from Cedar Junction upstream was cut out and improved to accommodate pack stock, it remained a challenge to travelers.[385] New Northwest correspondent Ben R. Dittes observed in June 1870, ". . . that most women who come to Cedar Creek have adopted the comfortable mode of riding on horseback male-fashion. To attempt the ascent of the Cedar Creek trail on a side saddle is dangerous to rider and horse owing to the uncertain balance on a lady's saddle."[386]

It was over these trails, then, that a steady stream of miners and entrepreneurs entered the Cedar Creek diggings. Tents, shanties, and cabins soon strung out haphazardly along the Creek and its tributaries. Two towns, Cedar Junction and Louiseville, grew up during the winter stampede of 1869-1870. Located on the flat near the mouth of Oregon Gulch, Cedar Junction got its start as the terminus of pack and saddle traffic up Cedar Creek. Also known as Cedar City or Junction City, it was the initial supply point for the Cedar Creek diggings and served as the trade hub for the "lower" or O'Keeffe district. A visitor described the townsite in a January 4, 1870 letter to the Helena Daily Herald:

Two streets forty feet wide run parallel up the gulch, divided into lots of 40 x 100. Substantial log houses are being erected and the sound of the saw and axe is heard from morning until night. Chauncey Barber is town Recorder, and has his office in Jack Simmons'cabin, which was the first log shanty completed in town. Williams, the pioneer barber of Montana, has a barber shop in full blast, and two stores. McQuirk, of Missoula, and George Montgomery of Beartown, deal out the necessaries of life, and bottled inspiration.

Ten days later, Jim Vogan estimated that the camp had 60 buildings under construction. Twelve completed structures included the 16' x 30' general store/restaurant of McWhirk & Warren; the 12' x 30' restaurant of Joe Appollonio; James Talbot's billiard hall; the 20' x 20' miners'store belonging to George Montgomery & Co.; Lehman & Newman's 20' x 30' liquor warehouse; and dwellings belonging to Vogan, George Hany, Green Pruett, and A.J. Simmons. Vogan also noted that large numbers of men were engaged in whipsawing lumber for buildings and sluices. By the end of March, Cedar Junction reportedly contained 91 houses "good, bad and indifferent", including an auction house and the 20' x 40' frame post office. This apparently marked Cedar Junction at its peak, for on April 23,1870 Helena journalist Ephraim B. Walker counted only "about fifty houses, built of cedar, two-thirds of which are occupied." Another Helena correspondent wrote in late May that the town "contains some thirty or forty finished and unfinished buildings, a population of 23." It is possible that many

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[385]New Northwest December 24, 1869; January 14, 1870; Helena Daily Herald January 18, 1870; January 21, 1870; March 3, 1870; May 25, 1870.
[386]New Northwest July 1, 1870.

buildings were dismantled and moved to other locations, or the lumber used in sluices and flumes. While some accounts claimed that the camp had been nearly abandoned by early June, Ben R. Dittes wrote on June 15 that Cedar Junction had a population of 32, not counting its growing Chinese population.[387]

Faring considerably better was Louiseville, four miles upstream from Cedar Junction. Also laid out during the first days of the stampede, the town was originally named in honor of Adolph Lozeau's wife, Louise, who had fed and lodged many prospectors at the Lozeau ranch on the Mullan Road.[388] Popular usage apparently corrupted it to Louisville, with many believing the camp had been named in honor of Louis Barrette. In early January 1870, the town contained only a dozen houses, but already much of the surrounding cedar forest had been cleared and the large two-story Louiseville House hotel was under construction. By March 1870, Louisville had swelled to 69 houses and, as one observer noted, "All day long may be heard the merry ring of the hammer, the labored grating of the whipsaw, and the heavy thud of another monarch of the forest laid low."[389] By mid-April, the town was credited with 100 houses, nine stores, three saloons, a butcher shop, shoemaker's shop, four blacksmith shops, two washhouses and a drug store. Montroy & Drolette's Louiseville House was completed and hosted Territorial Governor Ashley a month later. Crammed as it was onto a small flat by Cedar Creek and up into the narrow confines of Town Gulch (now China Gulch), Louisville was described by one correspondent as "a narrow, contracted side hill town (but the best they could do for the lay of the country), full of people who charge strangers $1 for sitting straight up on a stump, and roll him if he falls off. Houses are being rapidly built, and occupied for various branches of business, principally saloons. The common currency and legal tender of the country is the great' American educated finger and jaw bone."[390]

Several other camps sprang up along Cedar Creek in early 1870. The townsite of Mugginsville (better known as Cayuse or Kiyus) was laid out at the mouth of Cayuse Gulch in January 1870. Intended to serve as a supply center for the Cayuse mines, it never grew beyond a cluster of cabins. Two miles above Cayuse was Lincoln City about which little is known, except that a Christmas ball was held there in December 1870, and that by January 1873 the townsite had been obliterated by mining debris. Martina City was laid out in 1870 "on a flat spot on top of a mountain" 600 feet above Louisville. The townsite was an attempt to provide lots for latecomers who found all available space occupied in Louisville. Few if any settled at Martina, and the site was later used for a "bull-pen" for "bull, dog or biped fighting." Jamestown was platted in January 1870 at the mouth of Illinois Gulch, but like Martina City it apparently never took hold.[391]

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[387]NewNorthwest December 31,1869; January 14,1870; March 25,187Q, June 17,1870; Helena Daily Herald January 18, 1870; February 10, 1870; March 28, 1870; April 27, 1870; May 25, 1870.
[388]New Northwest December 31, 1869; January 4, 1870; Davis, Gumboot Gamblers, 15-16.
[389]Helena Daily Herald January 18, 1870.
[390]New Northwest December 10, 1869; December 24, 1869; April 15, 1870; Helena Daily Herald January 18, 1870; January 21, 1870; May 25, 1870; June 14, 1870.
[391]Helena Daily Herald January 18, 1870; January 21, 1870; May 25, 1870; New Northwest June 17, 1870; January 18, 1873; Missoula Pioneer December 29, 1870.

More enduring was Forest City, which served the Summit district, including Snow Shoe and California Gulches. Established in the spring of 1870, Forest City was located. near the mouth of Marion (now Mary Ann) Gulch, four-and-a-half miles above Louisville. By the end of May it consisted of between 20 and 30 houses, including several businesses, and by July, express and mail service to Louisville was extended to include Forest City.[392]

As miners poured into the Cedar Creek camps, mining districts at Beartown, Lincoln, Helena, Deer Lodge, Virginia City and Idaho's Clearwater camps all experienced a drain on their populations as men left to investigate the most recent of Montana's gold excitements. Among those who participated in the Cedar Creek stampede were several who later figured prominently in state or local affairs. A.B. Hammond went on to become a partner in the firms of Eddy, Hammond & Co., and the Montana Improvement Company, a timber subsidiary of the Anaconda Company.[393] John Caplice eventually became an important merchant and civic leader in Butte.[394] The Buck family--brothers Amos, Henry, Fred, and and their cousin Charles--played an important role in the agricultural development of the Bitter Root Valley and the community of Stevensville.[395] A.J. "Jack" Simmons, prospector and Cedar Junction postmaster, later served as government agent to the Blackfeet.[396] Helena merchant and former Montana territorial treasurer John H. Ming both prospected and carried on his retail trade in Cedar Creek, furnishing miners with "stationery, fancy goods, and cigars" during the early days of the placer boom.[397] J.H.T. Ryman & G.A. Wolf, who later founded the Western Montana Bank in Missoula, were mining partners at Cedar Creek.[398] Thomas McTague, known as "Long Tom" in his Cedar Creek days, in partnership with Frank Conley built and operated Montana's prison at Deer Lodge into the early twentieth century.[399] Father Anthony J. Ravalli was a visitor to the camps, as were several of Montana's early political figures, including William "Billy" Clagett and Territorial Governor James Ashley.[400]

During the initial flurry of exploration and testing in early 1870, miners' methods involved the usual pick-and-shovel work and the use of rockers and sluices. However, it soon became apparent that most of Cedar Creek's placer deposits were too deeply buried to be worked by these methods. Miners resorted to drift-mining, a form of placering that had much in common with hardrock mining. In drift-mining, a tunnel or shaft was driven into the ground to provide the miners access to the gold-bearing deposit. Gravel was then excavated from the drift and washed through the sluices by the usual placer methods. The hazards of underground mining were compounded by

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[392]New Northwest January 14, 1870; June 3, 1870; July 15, 1870; Helena Daily Herald May 25, 1870.
[393] Leeson, 1308.
[394] Leeson, 859; New Northwest August 19, 1870; Missoula Pioneer August 22, 1870.
[395] Leeson, 859; Davis, Gumboot Gamblers, 26; New Northwest May 11, 1872; The Missoulian November 27, 1873.
[396] Leeson, 860; New Northwest December 31, 1869; January 14,1870; March 18,1870; March 25,1870; April 1, 1870; June 4,1870; May 18,1872; Helena Daily Herald January 21,1870; January 31,1870; March 10, 1870.
[397] Leeson, 1237; New Northwest June 24, 1870; Helena Daily Herald January 18, 1870.
[398] Jack Viche, interview with Mike Ryan, USFS, Superior, MT, May 11, 1982; Dale M. Johnson, Archivist, University of Montana, telephone conversation with Mary Horstman, n.d.; New Northwest August 19, 1870; The Missoulian October 14, 1874.
[399] The Missoulian March 21,1873; August 14,1874; September 2,1874; September 23,1874; Mineral County Press January 25, 1917.
[400] Davis, Gumboot Gamblers, 69, 74, 83; New Northwest February 11, 1870; March 18, 1870;. June 6, 1871; July 26, 1871; August 5, 1871; Helena Daily Herald May 25, 1870; May 26, 1870.

the fact that drift-mining deposits were generally soft. They gave way easily and often without warning, especially after a hillside had been honeycombed by numerous drifts. Drift-mining at Cedar Creek was further complicated by the fact that the drifts were driven in wet ground, sometimes under the streambed itself. This necessitated the extensive use of drains and pumps. So-called China pumps, suction pumps, water wheels and drain ditches were common throughout the diggings, along with the usual network of flumes and sluiceboxes. Cave-ins were frequent at Cedar Creek, with at least three fatalities and numerous serious injuries between 1870-1874.[401]

Placer activity in the Cedar-Quartz area peaked sometime in June or July 1870. Although population estimates varied widely, the most reliable contemporary accounts seem to indicate that somewhere in the neighborhood of 4,000 prospectors were present in Cedar Creek and the neighboring watersheds of Trout, Sunrise, Meadow and Quartz Creeks, where other profitable diggings had been uncovered.[402] At mid-summer 1870, Louisville boasted some 80 or 90 structures, a combination of tents, log cabins, and frame buildings. The camp's hotel was a large two-story frame structure that included a 35' x 25' saloon-music hall in its cellar. By far the largest of the camps in the Cedar-Quartz mining region during the boom era, Louisville's resident population at the time was probably around three hundred.[403] At the same time, Cedar Junction consisted of between thirty and fifty structures. According to Ben Dittes, these included one store, one restaurant, two saloons, one brewery, one Chinese washhouse, a Post Office, one sign paint shop, and one vegetable garden in town, and two "extensive kitchen gardens" just out of town. The town's resident population consisted of "32 permanent residents to be depended upon in case of fire" and a "growing" Chinese population of unknown number.[404]

As prospectors moved into the surrounding watersheds in the spring and summer of 1870, they organized new mining districts on Trout, Sunrise, Meadow, and Quartz Creeks. Several small mining camps evolved, most notably those on Sunrise (originally Sun Rise) and Quartz Creeks. In early July a stampede to promising ground on SunRise resulted in the establishment of Sun Rise City, near the head of the drainage. Also known as Crescent City (for the crescent-shaped bar on which it stood), the camp was described in late July by Ben Dittes: "Thirteen houses of some pretensions, outside of the miners cabins, make the town site; 2 stores, 1 blacksmith shop, 2 saloons and one bakery are running full blast, and the other houses are fitting up for business."[405] Two pack trails were cut to facilitate travel to the camp, one to intersect with the Ames Road along the Clark Fork (probably via Meadow Creek), and a second to connect Sun Rise with Louisville. William Burmaster and Ted Sweeney built the latter, their work financed by subscriptions raised in Louisville.[406]

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[401] Fred D. Smith, 'The Cedar Creek Placers, Montana." Engineering and Mining Journal (February 4, 1899): 143; New Northwest April 1, 1870; November 25, 1870; December 14, 1870; December 2, 1871; March 30, 1872; Missoula Pioneer November 24, 1870; The Missoulian January 12, 1871; April 6, 1871; April 16, 1874; October 28, 1874.

[402] New Northwest June 3, 1870; July 20, 1870; July 29, 1870; Davis, Gumboot Gamblers, 56-57.

[403] New Northwest August 19, 1870.

[404] New Northwest June 15, 1870.

[405] New Northwest August 5, 1870.

[406] New Northwest July 15, 1870; August 12, 1870.

On Quartz Creek, two districts, Upper Quartz and Lower or Mouth of Quartz, were organized in June 1870 and two small camps, Oroville and Quartz, grew up around the diggings. Located in the Upper Quartz district, Oroville was probably settled during the initial Quartz stampede in June 1870. Little is known abut the camp beyond the fact that a crowd of 75 gathered there in July 1871 to hear congressional candidate Billy Clagett speak. Quartz (also known briefly as Bluff City) was probably no more than a handful of cabins, a store and a saloon known in 1870 as Sandy's Quartz Mill.[407]

With the growth of the Cedar-Quartz mining districts and increased trade and traffic over travel routes, attempts were made to improve access to the camps. In July 1870, John J. Kennedy put a free ferry over the Clark Fork at Cedar Creek in operation. Kennedy was a freighter and miner who had come west to Colorado during the Pike's Peak Gold Rush, working in mining camps in Idaho, British Columbia and Montana before joining his brother William in the Cedar Creek stampede. The operation of Kennedy's free ferry caused Booth & Bourassa to cut their ferry rates and to undertake construction of a toll bridge over the river just downstream from Cedar Creek. The Kennedy Brothers then turned their energies to improving the trail from Cedar Junction to Louisville, completing the project in September 1870 with money raised by subscription from miners and merchants.[408] It was at this time that the Louisville to Sun Rise pack trail was completed by Burmaster and Sweeney. The Sun Rise trail soon became a part of a new wagon road connecting Moose Creek Ferry to Cedar Creek by way of Meadow Creek, Sun Rise, Windfall Gulch, and Deep Creek. Opened in early October 1870, the new route avoided a long grade on the Mullan Road and allowed more direct freight and stage service to many of the camps on Quartz, Meadow and Trout Creeks.[409]

At the river crossing just downstream from the mouth of Cedar Creek, where the ferries connected the Mullan Road and the southside and Cedar Creek trails, two sizeable villages grew up along the Clark Fork in early 1870: Mouth of Cedar on the south side of the river, and Superior City on the north side. Due to their location, the settlements were popular stopping places for travelers and freight and soon became important supply centers for the mines. In May 1870 a steam sawmill began operation at the mouth of Cedar Creek, providing lumber for, among other things, the construction of the Booth & Bourassa Bridge. When the bridge was completed in November 1870, the villages merged into a single community known as Superior. The town consisted of roughly two dozen houses, three hotels, a stable, a stage station and Wells Fargo office, three saloons and at least one store. The resident population totaled approximately 125.[410]

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[407] Davis, Gumboot Gamblers, 79.

[408] New Northwest July 29, 1870; August 8, 1870; November 25, 1870; Missoula Pioneer December 8, 1870.

[409] Missoula Pioneer September 29,1870; Rocky Mountain Gazette October 4,1870; A.L. Stone, Following Old Trails (Missoula, MT: Gateway Printing & Litho, 1975), 34-54.

[410] New Northwest June 1, 1870; July 29,1870; October 6,1870; November 25,1870; January 18,1873; Helena Daily Herald February 10, 1870; The Missoulian September 12, 1874.

Besides serving as a travel and trade center during the Cedar Creek placer boom, Superior was also the center of the agricultural area serving the camps. During the winter of 1869-1870, the boom camps relied on wild game and fish, on butchered pork packed in over the trails, and on beef cattle driven from the Deer Lodge, Missoula, and Bitter Root Valleys. By the summer of 1870, a few gardens and potato patches had been planted at Cedar Junction, and a man named Freeman pastured dairy cows two miles below that camp. The profits to be made in supplying food to the miners soon lured others to take up homesteads along the Clark Fork near the mouth of Cedar Creek. The most successful of these was C.W. Berry, who established a farm about one mile east of present-day Superior for the purpose of supplying meat, grain and vegetables to the Cedar Creek mines. It was said that Berry produced most of the vegetables consumed by the miners between 1870 and 1875. During the summer of 1872, he marketed an estimated 90,000 lose of potatoes, vegetables, grain, and about 100 chickens at the mines. Downstream, Ed Warren operated the Moose Creek Ferry along with raising beef and potatoes for miners in the Quartz Creek camps. Others, like the Buck Brothers of Stevensville, combined their mining activity at Cedar Creek with farming or ranching at Frenchtown, Missoula, or the Bitter Root Valley.[411]

The boom era ended in the Cedar-Quartz placers in late summer 1870. The portion of the population labeled by one editor as "superfluous drifters" had moved on; the most promising claims had been occupied; and mining activity decreased due to the seasonal drop in water supply. In mid-August, the 1870 federal census showed only 1,646 men, women and children of all races in the entire Cedar district, which apparently included the surrounding watersheds. The ethnic breakdown of the census list shows that French Canadians were still the largest ethnic group in the camps with 313, followed by the Irish with 251. Other groups represented were English (49), French (45), Chinese (30), American Indian (10), and African-Americans (7). The census counted only 35 women in the camps (including 5 American Indian, 2 Chinese, and 2 African American) and 42 children under the age of 15, ten of whom were American Indian and two African American. Although the census probably failed to list many miners in remote gulches, and most likely counted only a fraction of the growing Chinese population, the decline in population reflected in the census is confirmed by the state of the camps.[412]

Cedar Junction, which had been partially destroyed by fire in early June 1870, had at the time only 30 or 40 residents. By late September the camp was nearly deserted, described by the New Northwest as "a monument of much lost labor and grub.... the City of Empty Houses." Only J.A. Robinson, Andrew Boyington, and two or three others remained through the winter, digging a drift-tunnel, running the post office and providing for travelers. The post office closed in January 1871. By September 1874 scavengers and forest fires had claimed most of Cedar Junction's remaining buildings.[413]

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[411] New Northwest December 31, 1869; June 17,1870; June 30,1870; July 4,1870; July 29, 1870; January 18, 1873.
[412] Helena Daily Herald June 7, 1870; Rocky Mountain Gazette September 9, 1870; Davis, Gumboot Gamblers, 56-57; Strombo .
[413] New Northwest June 3, 1870; June 10, 1870; June 17, 1870; Helena Daily Herald June 14, 1870;

From a population of around 300 in August 1870, Louisville dwindled to roughly 100 residents by June 1871, with only two stores in business. The decline of Louisville not only reflected the overall depopulation of the Cedar-Quartz placers, but also a continued gravitation of the remaining Cedar Creek miners toward more promising ground upstream near Forest City and the relinquishment of diggings to Chinese miners.[414] The first Chinese appeared in the Cedar Creek camps sometime in March 1870, but it was in August 1870 that they began to arrive in significant numbers. According to the New Northwest, the influx was partly due to Chinese miners being driven from Idaho's Moose Creek district earlier in the summer.[415] 0n September 20, Ben Dittes wrote that five companies of Chinese were working in different areas of Cedar Creek, "and many more trying to get hold of ground." On October 2, he reported that "Chinamen are coming in fast. A few over 300 males are now located here, and from these it is understood some four hundred more will come this winter."[416] By late October only nine Euro-American companies remained in the area between Cedar Junction and Louisville. In early November New Northwest editor James Mills wrote:

We have it from trustworthy sources that Louiseville has capitulated to the Chinese. The gulch above and below has passed into their possession. They have established a meat market, (their butcher shop for Americans is in China) a Chinese M.D. from Frisco has established an office, and probably the next move will be to oust Ben Dittes from the Postoffice. The whites are leaving, stores closing, property depreciating, and the glory has gone out of the town.[417]

There was some talk among Euro-Americans of driving the Chinese out. No action was ever reported, but in May 1871 the Missoula Pioneer stated somewhat cryptically that "A great many Chinamen are leaving this gulch for Gold Creek, the mines in Cedar being to [too] deep for the Celestials."[418] A major exodus of Chinese from the Cedar-Quartz area did occur in July or August 1872, when local miners blamed the theft of $4,000 in gold from the Caplice & Smith store at Forest City on a group of Chinese miners who had departed for the Coeur d'Alene country. Ed Warren and Pat McGrath recovered the gold twenty miles east of the Cataldo Mission, but insisted that the Chinese had escaped. Nonetheless, rumors persisted that Warren and McGrath had murdered them. Whatever the facts of the case, most Chinese fled the Cedar Creek mines soon after the Caplice robbery, leaving Louisville nearly empty.[419] By 1873, only two or three buildings remained at the townsite. Most of Louisville had been dismantled and its logs and lumber used in flume construction.[420]

As Louisville faded in late 1870 and 1871, much of the social and economic activity of Cedar Creek shifted to Forest City, four-and-a-half miles above Louisville. By February 1871 three restaurants, seven saloons, a billiard hall, a post office, and a hotel operated

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[414] New Northwest November 3, 1870; Missoula Pioneer January 12, 1871; Rocky Mountain Gazette October 24, 1870.
[415] New Northwest July 29, 1870.
[416] New Northwest September 23, 1870; October 7, 1870.
[417] New Northwest November 4, 1870.
[418] New Northwest November 10, 1870; Missoula Pioneer May 11, 1871.
[419] The Missoulian July 6, 1872; July 27, 1872.
[420] New Northwest October 12, 1872; January 18, 1873; The Missoulian March 21, 1873; September 2, 1874.

in the camp, sustaining a winter population of 170, including four women. Mining activity threatened to undermine the lower portion of the townsite in April 1871, leaving Gus Loddeis' saloon on stilts. Forest City flourished until the end of the 1872 mining season, when many of the surrounding placers were abandoned. Promising ground still farther upstream had given birth to the small camp of Mayville and several Forest City buildings were moved the half mile upstream to the new camp. An 1873 visitor to Forest City reported that at night only five places were lit up, three of them saloons, and he decided that the town had "served its day."

By then, most activity was concentrated at Mayville, so named because it was founded in May 1871 or, as one contemporary put it, because "it may become a ville." In early 1873, Mayville had seven saloons, two stores, a blacksmith, and a butcher, with new buildings under construction" to accommodate those left in Forest City." By March the camp was said to have 60 houses and cabins, a dancehall and 200 men. During 1873 and 1874, Mayville was the hub of Cedar Creek until an October 1874 stampede to the newly discovered placers on Nine Mile left barely 200 men in all of the Cedar, Quartz, and Trout Creek watersheds, including 75 in the Forest City/Mayville area. By June 1875, Mayville was described as "almost deserted" although two stores operated there at least through 1876. With the demise of Mayville, Forest City recovered somewhat, its post office and store serving the miners of Cedar Creek into the early 20th century.[421]

Superior also suffered from the fading of the placer boom. In 1873 it consisted of only one store, one saloon, one blacksmith shop, a livery stable and one family (Mr. & Mrs. J. Booth and their child). Nonetheless the town had, in the words of Allen Boice, "become chronid'--of all the camps born in the Cedar Creek gold rush, only Superior survived as a permanent community. Missoula and Frenchtown, which had both received major boosts from the Cedar Creek activity were by the time of its decline well established as agricultural and trade centers, and therefore were little affected by the end of the Cedar Creek boom era.[422]

By 1873, most of the easily worked "pick-and-shovel" placers in the Cedar-Quartz region had been exhausted and many of the drift mines had reached depths where they could no longer be worked safely. Ground-sluicing and its technological progression, hydraulicking, were the only feasible alternatives, but these methods required higher volumes of water, necessitating the construction of larger flumes, dams, and reservoirs, and (in the case of hydraulicking) investment in hydraulic pipe, hoses, and the high-pressure nozzles known as giants. Although a few miners had the resources to undertake ground-sluicing or hydraulicking before 1873, for the most part, the lack of available water, dump ground, sawmill facilities, and capital precluded widespread use of these methods. As the "poor man's ground" played out in 1872 and 1873, many miners left the Cedat-Quartz diggings, selling or abandoning their claims. As a result, additional water rights and placer claims were open to relocation, making, more ground available for flume rights-of-way, dumps, and reservoir construction. This

[421] New Northwest January 18,1873; February 20,1873; The Missoulian November 23,1872; March 21,1873; July 18, 1873; September 2, 1874; December 23,1874; June 2,1875; July 29, 1881; September 18,1883; Missoula Gazette November 24, 1886.
[422] New Northwest January 18, 1873; The Missoulian September 2, 1874.

made it possible for men with capital to acquire the water and ground necessary to engage in higher-volume mining methods. A few men like merchant John Caplice had sufficient finances to underwrite mining endeavors while pursuing other businesses elsewhere. But most ground-sluice or hydraulic operations were undertaken by flume companies, partnerships of two or more miners who pooled their resources and labor. In the spring of 1873, Allen Boice spoke for many miners in the Cedar-Quartz area when he wrote of Quartz Creek: "This is a camp eminently fitted for bed-rock fluming [ground-sluicing], and eventually the whole creek will be worked that way and made to pay.[423]

The earliest attempt at building a flume substantial enough to provide the necessary quantity and force of water for high-volume placer methods occurred on Cedar Creek in late 1871, when Powers, Miller & Co. organized the Bedrock Flume Company at Cayuse. The original company, consisting of seven partners (Powers, Harvey, Frank Nolan, Ed Miller, Richard Quinn, Alex McNaughton, M. Farrell), invested between $10,000 and $12,000 in equipment and construction. By 1873, the Cayuse flume had been enlarged to a 30-inch width, carrying water one-and-a-half miles. The flume sustained an extensive mining operation on Cayuse Gulch into 1876, when the ground played out and the flume was abandoned.[424]

Two miles above Louisville, the Louisville or Villandry flume was constructed and in operation by January 1873. Owned by a company made up of Villandry, L.D. Drummond, Wm. Cameron, P. Wendfeldt, A.J. Briggs, and Victor Linberg, the flume supplied extensive ground sluicing in the Louisville area until 1876. Louisville itself was consumed by the operations of this and other flumes--the lumber and logs of its 80 or 90 buildings was salvaged for flume construction. By September of 1874, there was little left of the town, and a ground-sluicing operation was underway on the old discovery claims nearby.[425]

Ground sluicing began at Forest City in the summer of 1873 with the construction of the Forest City flume. Owned by a company that included John Caplice, the Forest City operation rapidly consumed much of the old townsite. An eyewitness described the effects of ground-sluicing there in May 1874: "rushing gravel through the flume, tearing down cabins, chimney, etc., and everything goes." Other flumes associated with ground sluicing or hydraulicking on Cedar Creek were located on Oregon Gulch (the Richards & Stapleton flume on Upper Oregon, and the Johnston Brothers flume on Lower Oregon Gulch); on Rabbit Gulch; and on Snowshoe. All apparently ceased operation around 1876.[426]

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[423] New Northwest November 25, 1870; May 3, 1873.

[424] The Missoulian November 2, 1871; April 16, 1874; May 21, 1874; September 2, 1874; June 2, 1875; July 29, 1875; March 15, 1876; September 13, 1876; April 6, 1877; New Northwest October 7, 1873.

[425] New Northwest January 18, 1873; The Missoulian March 21, 1873; September 2,1874; October 21, 1874; July 29, 1875; June 21, 1876; September 13, 1876.

[426] New Northwest October 7,1873; October 31,1874; The Missoulian January 22,1874; February 5,1874; April 12, 1874; April 16, 1874; September 2, 1874; March 15, 1876; March 18, 1876; Stout, 11, 413.

Quartz Creek was the scene of two major flume operations. The first was under construction at the Mouth of Quartz in July 1872. By May 1873 it provided water for round-the-clock ground sluicing near the old camp of Quartz, where a post office and store operated until late 1873 or 1874. In 1874 ' the Quartz flume was expanded or replaced by Ole Nelson & Co. who then mined the site with hydraulics, washing away the old townsite. To furnish lumber for construction and maintenance of the one-and-a-half mile, 32-inch-wide flume, Nelson erected a water-powered sawmill near the mouth of the creek. The hydraulic operation quickly exhausted the available water supply, necessitating the construction of a large reservoir on Quartz Creek in late 1874. With the reservoir, the Nelson Company continued hydraulicking until 1876, when it sold the ground to A. Cave. The second flume operation on Quartz Creek was that of Gelatte, Boice & Co. Five miles above the mouth of Quartz, the flume fed mining ground at Yreka, a loose community of miners' cabins that had grown up around Pat McGrath's store. A third flume on Quartz Creek proved less successful. Of unknown size and location, the flume was abandoned by McMannus & Co. in 1875, with the conclusion that they built it 'Where there are two bushels of rock to a quart of dirt."[427]

With the exception of the newly discovered Deep Creek mines, which were initially worked by drifting, the Trout Creek watershed also saw the construction of several flumes, beginning in September 1873. In Freezeout Gulch, Nelson, Johnson & Co. built a major flume to supply water for hydraulic mining in the gulch. Once in operation, the Freezeout flume worked three shifts, "rain, snow or Sunday." The Home-Stake Company of John Caplice, Ed Miller, John Harvey and J.W. Kelley operated the Windfall flume beginning in 1872-1873, and their company hydraulicked that gulch until at least 1876. Whether the Home-Stake partnership continued its involvement beyond 1876 is uncertain, but the flume continued to operate through 1877.[428]

Most flume operations in the Cedar-Quartz area worked three eight-hour shifts per day, seven days a week, while water was available. Crews varied in size from the six or seven men of the Richards & Stapleton flume to the ten or fifteen of the Cayuse flume. Most of these men boarded at company bunkhouses near the mining ground, where board as high as $9.00 per week was deducted from wages of between $3.00 and $5.00 per day. By 1876 most of the large ground-sluicing and hydraulicking operations had exhausted their ground, and the larger flumes were abandoned or sold with only a relatively few small-scale placer operations continuing in the Cedar-Quartz area. Some Chinese had returned to the area in 1874, and by 1876 Chinese miners were using the Forest City, Snowshoe, and Windfall flumes to rework old ground. In the spring of 1877 The Missoulian reported that nearly all of the mining in Cedar and Quartz Creek was done by Chinese. On Trout Creek, several Euro-American companies continued to

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[427] New Northwest July 20, 1872; May 13, 1873; The Missoulian October 17, 1873; February 5, 1874; August 26, 1874; October 7, 1874; July 29, 1875; September 15, 1875; September 13, 1876.

[428] New Northwest September 20, 1873, October 31, 1874; The Missoulian February 5, 1874; April 16, 1874; September 2, 1874; September 12, 1874; June 2, 1875; July 29, 1875; March 15, 1876; June 21, 1876; September 13, 1876; April 6, 1877; The Mining Journal May 30, 1932.

work, most notably at Deep Creek (where drifting was still in progress), and on the Johnston Brothers placer below Gray Gulch.[429]

Second Period of Significance: Mechanization, 1884-1940

The exhaustion of the relatively high-grade placer gravels by the early hydraulicking and ground-sluicing efforts of the 1870s brought to a close the first phase of mineral extraction in the Cedar-Quartz area. The completion of the Northern Pacific Railroad's main line in 1883 opened a new era of development, by providing improved transportation and easier access to heavy mining equipment and power-driven machinery needed for the successful working of lode and lower-grade placer deposits. Small-scale hand placering continued throughout the Cedar-Quartz area during this second period, but small-to-medium-scale mechanized mining, characterized by company- or family-owned mining camps, became a dominant -feature. What follows is in no way a complete history of mining activity in the area between 1884-1940. It is, however, a representative sampling of operations typical of mining in the Cedar-Quartz watershed during this period.

Mechanized mining came to Cedar Creek in 1886 with the formation of the Cedar Creek Consolidated Mining Company. The firm had its origins in the partnership of Cedar Creek pioneers Louis Barrette and George Conford, who undertook the hydraulic mining of the Forest City area in 1884. After replacing the old Forest City flume (destroyed by fire in 1881), they were joined in their enterprise by brothers Alphonse and Joseph Treffle LaCasse, and in 1886 by Thomas Asselin. Barrette, the LaCasses, and Asselin bought out Conford's interest, forming the Cedar Creek Consolidated Mining Company. With completion of the Northern Pacific Railroad's Coeur d'Alene branch in 1890, the Cedar Creek company was able to ship the heavy equipment needed to develop their 400 patented acres for hydraulic mining. In 1890, a steam-powered sawmill was packed on horseback from the railroad siding near Superior to the Cedar Creek Consolidated ground near Forest City. Included in the sawmill equipment was a 20-horsepower boiler, making the Consolidated the first mining company in the area to employ power-driven equipment in its operation. The sawmill had a 6,000-foot per day capacity, providing lumber for the construction of two reservoirs.

895; a large flume in 1896 (and according to some sources, a second one sometime later); and a dam and third reservoir in 1899. The new reservoir furnished 200 feet of pressure for two hydraulic giants. Compared to the flumes built during the 1870s, the new Consolidated flumes were enormous, measuring 4-feet-wide by 8-feet-deep, running 4,000 feet in length. Atop of the flume ran a track for a small car, in which equipment was carried from one end of the works to the other. The operation employed mercury-charged riffles, using some 200 pounds of mercury each year. During the 1890s and early 1900s, the LaCasse placer, as the Consolidated diggings became known, employed crews of from 15 to 50 men, housed in company quarters. Originally located

[429] New Northwest January 18, 1873; The Missoulian April 16, 1874; September 2, 1874; October 28, 1874; March 15, 1876; March 18, 1876; September 13, 1876; April 6, 1877; Davis, Gumboot Gamblers, 91, 103; Raymond, Report 1876, 265.

at the site of Forest City, in four of the old town's buildings, the company's camp was moved in 1905 to the mouth of California Gulch. In 1906, the Cedar Creek Consolidated Mining Company was reorganized into the Cedar Creek Placer Mining Company, Inc. The following year the LaCasse claims were optioned to the Kansas City Commercial Company.[430]

In a major departure from the prevailing use of hydraulic giants and ground sluices in the Cedar Creek district, the Kansas City Commercial Company decided to install a floating dredge on the LaCasse placer in 1909. Built by the Marion Steam Shovel Company at a cost of $100,000, the stacker-type electric dredge was equipped with 63 buckets of seven cubic feet capacity each, giving the dredge a daily capacity of between 3,000 and 4,000 cubic yards per day, or 100,000 cubic yards per month. Delivery of the equipment to the dredgesite from the terminus of the Amador Railway was a major undertaking, requiring the construction of an improved road over the old rough trail to the LaCasse property. The dredge operation employed 30 men, including three pilots, six oilers, one dredgemaster, one electrician, and two laborers. The dredge drew its power from a power plant constructed two-and-a-half miles below the dredgesite. The power plant consisted of a 2,300-volt dynamo run by two coal-fired boilers of 200 horsepower each. (The company planned to replace the boilers with a water-powered Pelton wheel, but it is not certain that this was ever done.) In 1910, the power plant and dredge operated around the clock for ten months. The Kansas City company operated the dredge for four years, from 1909 through 1913, when the company folded. The claims reverted to Treffle LaCasse, who then operated the dredge until 1917. A salvage company purchased and dismantled the dredge machinery, leaving only the dredge frame at the site. After 1917, the LaCasse placer was again worked by hydraulics.[431]

Although the LaCasse/Kansas City operation was by far the most extensive on Cedar Creek during this period, at least three other placer mines in the watershed are worth noting. Just above the LaCasse placer was the property of Superior Mines, Incorporated. Formed in 1926, the company's original ground was comprised of five claims, totalling 380 acres, but eventually included a portion of the LaCasse ground. During the early 1930s, the Superior Mine camp consisted of five bunkhouses, an office, a blacksmith shop, a sawmill, and a waterpower plant. The crew varied from four in the winter to twenty during the mining season. Although the operation initially used hydraulics and 4,900 feet of flume, the company sunk a shaft for drifting in 1932. By 1939, in addition to its hydraulics, the company also operated a one-and-a-half cubic yard power shovel and dry-land washer, treating about 90,000 cubic yards of gravel during a seven-month season. This so-called dry-land dredge produced the bulk of the Cedar Creek district's placer output in 1941, but presumably suspended operations with the imposition of wartime regulations on precious metals mining in 1942.[432]

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[430] Lacasse, "Joseph Clarence Lacasse," 11 -13; The Missoulian July 29, 1881; Smith, "The Cedar Creek Placers, Montana," 143-144; USFS, 'Gold Dump Claim & Others'.

[431] Mining & Scientific Press January 1, 1910; Mining World August 27, 1910; Lacasse, 13-14; Mineral Resources 1917, /, 358; Mineral Resources 1918,1, 282; Mineral Resources 1919, /, 524.

[432] USFS, "Gold Dump Claim & Others"; Directory of Montana Mining Properties 1935, 61; Minerals Yearbook 1939, 382; Minerals Yearbook 1941, 383; The Mining Journal August 15,1930,48; October 30,1932,22; June 15, 1934, 24; September 30, 1941, 27.

Around the turn of the century, the Big Flat Mining Company began hydraulic mining of the Big Flat area of Oregon Gulch. Because no roads led into Big Flat, the company built a mining camp consisting of a bunkhouse, cookhouse, and office building to house its personnel. The Big Flat company remained active through August 1910, when smoke from the great 1910 forest fires forced a temporary shutdown. Little work was done at Big Flat over the next three years, but in August 1914 the placer was reopened for an unknown period of time. When mining again was suspended at Big Flat, the company reportedly employed Al Wade (for whom Wade Peak is named) as a watchman at the camp until 1930. That year Montana Dredge & Engineering Company acquired the Big Flat claims. The firm's president and general manager, Guy L. Covington of Seattle, renovated the old camp and erected several new buildings closer to the creek. He also activated a small sawmill just upstream that may have been part of the earlier Big Flat operation. The lumber produced was used in construction of a flume and dam in 1931-1932. The flume carried water from Missoula Gulch along the hill to the west of the present-day Big Flat road, supplying water for camp use and for hydraulic giants. The sawmill also furnished lumber for building construction and the repair of a large flume on Oregon Gulch. In 1935, Covington (who had designed power excavation equipment used by many Northwest mines) installed a two-cubic-yard capacity Covington dry-land dredge at Big Flat and it was in operation by 1936. Covington also built the first road connecting Big Flat to the main Cedar Creek road. Sometime prior to 1931, Charlie Miller had extended the Cedar Creek road from LaCasse's camp as far as Miller Saddle. In 1931, Covington built the road from Miller's Saddle down into the Big Flat camp.[433]

From 1903 to 1924, brothers I.H. "Ike", Charlie, and Lee Gildersleeve worked placer claims on Freezeout Gulch, near the head of Trout Creek. In 1924, Ike's son George convinced the elder Gildersleeves to relocate on Snowshoe Gulch in the Cedar Creek watershed. The Snowshoe claims, known as the Stemwinder placer, lay just upstream from the LaCasse placer and Superior Mines site. The Gildersleeves extended the road from the latter to their claims in 1930, using "dynamite, a team of horses, and pick-and-shovel." From 1924 to the 1990s, the family practiced both placering and hardrock mining at the site. (Hydraulicking ceased in 1972 due to water quality concerns.) Built in the early 1930s atop a terrace of old hydraulic tailings, the Gildersleeve camp consisted of a bunkhouse, cookhouse, blacksmith shop, a cabin, and two storage sheds. During the late 1920s, George and Charlie Gildersleeve whipsawed the lumber needed for sluices, but they later moved steam-powered sawmill equipment to the camp from California Gulch. The Gildersleeve camp played an important role in the life of the Upper Cedar Creek drainage during the 1930s, 1940s, and 1950s. Its location on the upper reaches of Cedar Creek and (after 1938) its telephone link made it a popular stopping place for hunters and travelers much of the year, and it was the scene of many social gatherings for the people who lived and worked on the Creek

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[433] Childress notes, LNFHP; Mineral County Press August 27,1914; The Mining Journal October 15, 1933,14; April 15,1935, 21; May 15,1936, 23; May 15,1937, 26.

during the 1930s and 1940s. During the winter, Forest Service personnel made frequent use of the camp during snow depth surveys and wildlife counts.[434]

Besides the four discussed above, several other mechanized mining enterprises worked portions of the Cedar Creek watershed during this period. Most of these however, left little or no historic record for examination in this report. For example, the Oregon Creek Mining Company is known only through a single January 1933 Mining Journal item. Headed by Harry L. Fisher of Boise and backed by "25 Boise men and residents of Spokane, Seattle, Portland, Los Angeles and Oklahoma," the company supposedly -held 68 1/3 acres of placer claims stretching for nearly three miles along Oregon Creek. A crew of sixteen men worked the ground with an unknown number of steam shovels, with a total processing capacity of 500 yards of gravel per day. Additional research is needed to determine the location, extent, and duration of this and other similarly vague undertakings.[435]

Trout Creek

Beginning in the late 1890s, several other sizeable hydraulic operations were underway throughout the Cedar-Quartz watersheds. On Trout Creek, a steam pumping plant and hydraulic elevators were among the "several tons of machinery" hauled to the Trout Creek (also known as the Johnston) placers below Gray Gulch in 1899. The property of a prominent early-day Superior resident, A.P. Johnston, the placers were sold in 1919 to a New York syndicate.[436] In 1938, a portion of the former Johnston ground, the Eclipse claim, was acquired from the Trout Creek Gold Placer Mining Company by Superior Gold Placer Mining Company. Superior Gold also acquired the Van Ness claim, which had been owned by Walter H. Hanson & Associates since 1928. In 1941, Superior Gold worked the two claims with a one-and-three-quarter yard steam shovel, a washing plant, three two-yard capacity dump trucks, and a crew of fifteen men.[437]

On Windfall Creek, owners of the Sunday and Landowner claims combined their operations in 1888, forming the Landowner Consolidated Mining Company, Inc. Principals in the new company were W.H. Palmer, James Vanness, Smith Davis, John Hayes, and Donald Mitchell. Plans to expand the mining operation in 1890 included construction of a sawmill. The Windfall placers were among the major producers in Missoula County from c. 1910 well into the 1930s. By 1911, 300 acres of Windfall claims and 80 acres of timber land were owned by A.M. Stevens. His Windfall Placer Mining Company employed both hydraulic and ground-sluicing methods, and in 1911 the property included several buildings, a reservoir, boom dam, and sawmill. Nearby in Ohio Gulch were the claims of Adam Thielen and Charles Moorehouse. In his book Following Old Trails, A.L. Stone recounted a lengthy visit with Thielen in 1911, and described the Ohio Gulch and Windfall mining activities. Mining on Windfall Gulch

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[434] Fern Gildersleeve, Interview, 1982; Interview, 1991; Interview, 1995; Deborah J. Davis, Along the Mullan Trail (Superior, MT: Mineral Publishing Co., 1986), 5-10; Margie E. Hahn, Mules & Mountains: Walt Hahn, Forest Service Packer (Stevensville, MT: Stoneydale Press Publishing, 1993), 47, 73.

[435] Mining Journal January 30, 1933, 18.

[436] Engineering & Mining Journal November 11, 1899; Stout, 11, 413.

[437] Mining Journal May 30,1938, 28;

continued into the 1930s, with the major operator at the time identified as Irene Lu Mines, Inc.[438]

The Deep Creek placers on Trout Creek had been worked by drifting from their discovery in the 1870s until well in the 1890s. According to Jack Viche of Superior, the drifting on Deep Creek in the 1880s and 1890s was the work of Chinese miners, who dug tunnels some twenty feet long and two feet square while lying on small pulley carts. Mr. Viche knew Cedar Creek John, the last of the Chinese miners in the Cedar-Quartz area, who died in Superior sometime after 1915. Around the turn of the century, the Deep Creek placers were acquired by the Michigan partnership of Eddy & Klingensmith, who employed a large flume from Trout Creek to supply their hydraulics. Known as the Eddy placer, the mine was among Missoula County's principal placer producers through 1928. During the 1920s, the Eddy camp consisted of two or three buildings of whipsawed lumber. These included a cookshack, which contained a kitchen/messhall and cook's quarters, and a bunkhouse where miners padded board beds with homemade mattresses stuffed with beargrass. The mine drew its water for hydraulicking and ground-sluicing from a large reservoir equipped with a boom dam. In 1927, Eddy sold the placer to E.A. Higley, a mine promoter. After Higley was arrested in New York for a stock scam, the property was sold at a sheriff's sale to Fred Horning of Superior in the early 1930s.[439]

Meadow Creek

Between 1909 and 1925, the USGS listed the "Meadow Creek placers" among the most productive in the county, but little information has been uncovered regarding the ownership and nature of these placers. At least two extensive placer excavations in the watershed appear to date from this period. Claims at the mouth of Smith Creek were worked during the 1920s, and possibly earlier. The Big Nugget Mining Company worked this site during the late 1920s, laying some 3,000 feet of pipe for its hydraulic and ground-sluicing operations in 1928. Mining continued at the Smith Creek site at least through 1941, when Adams & Eller of St. Regis sublet the property from the Big Nugget Placer Mining Company and worked it using both a steam shovel and hydraulic giant.[440]

Superior resident Russell Corn recalled working at the Big Nugget diggings during the 1930s, for "an outfit from Minneapolis, run by a fellow named Patten or Patton." Corn recalled that around 1936-1939 the company camp consisted of at least two bunkhouses (housing 24 men), a cookhouse, a manager's cabin, a barn, and a sawmill. The diggings were equipped with a reservoir, a boom dam, and hydraulic giants. (A dragline or powershovel apparently operated on the site as well, although the timeframe is uncertain.) The reservoir featured an automatic (self-regulating) gate built by the camp

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[438] The Missoulian December 19, 1888; December 26, 1888; Montana Inspector of Mines, Annual Report, November 20, 1890; Stone, 36-50; Mines & Minerals May 1911, 581; Mineral Resources 1929, 1, 866-867; Mineral Resources 1930, 1, 421-422; Minerals Yearbook 1934, 403.

[439] Mineral County Press August 20, 1914; Jack Viche, Interview, 1982; Russell Corn, Interview, 1982; Mining World August 4, 1906, 137; Stone, 50-52; Mineral Resources 1928,1, 597-598; Mineral Resources, 1929, 1, 866-867; Mineral Resources, 1930, 1, 421-422.

[440] Mineral Resources 1909-1925; Mineral Resources 1928,1, 597-598; The Mining Journal July 15,1938, 29; July 30, 1941, 24.

carpenter Evan Olsen. A Pelton wheel powered the sawmill, which predated the 1930s operation. A second set of claims on Meadow Creek, roughly a mile above the Big Nugget site, may also have been worked during this period, as were claims on Little Bear Gulch in the Meadow Creek watershed, but little is currently known about either site.[441]

Quartz Creek

Placer miners worked numerous claims throughout the Quartz Creek watershed during the 1880s and 1890s, but little is currently known about specific operations. In January 1896 Western Mining World reported that a placer camp on Quartz Creek "gives employment to a number of miners." Although additional research is needed to identify the site, it was quite possibly on or near the Mouth of Quartz claims. The Missoula Placer Mining Company worked these claims --nearly 240 acres--during the early 1900s, until 1912 or later. Upstream from the Missoula Placer ground were several other significant placers that operated, from the early 1900s into the 1930s and later: the CB&Q, the Silver, the Dakota, and the 120-acre Stockholm placer, as well as placer properties on McFarland, Tucker, and Louisiana Gulches. Most were worked by either hydraulic or ground-sluicing methods, requiring the construction of flumes, reservoirs and boom dams. The Dakota was a drift mine in old hydraulic diggings near the head of Quartz Creek. Along with the Stockholm, the Dakota was frequently listed by the USGS among the most productive placers in the entire Cedar Creek district.[442]

HARDROCK MINING

Amador Mine and Railroad

Although several quartz lodes were discovered in the Cedar-Quartz watersheds during the 1870s, it was only after completion of the Northern Pacific's Coeur d'Alene spur in 1883 that improved transportation and access to heavy mining equipment made hardrock mining feasible. The most important of the area's lodes was discovered in 1872, when Charles Glassert discovered a copper outcrop on Cedar Creek between Cayuse Gulch and Louisville. He kept the find to himself until 1884, when he filed a location naming it the Amador lode.[443] Little development occurred until 1900, when the Amador Copper & Gold Mining Company was organized. Over the next several years, in spite of a series of corporate reorganizations and litigation, the Amador's owners undertook an ambitious development program. By 1907, the Amador properties included the mine, its waterpower plant, and an electric tramway; an eleven-mile ore-hauling railroad; the 200-acre townsite of Amador City, near the mouth of Cedar Creek; and a small (60-ton) pyritic test smelter near Amador City. Litigation forced the mine's shutdown in 1908 and production did not resume until 1913. In 1915, the Intermountain Copper Mining Company, a syndicate of Coeur d'Alene mining men,

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441 Russell Corn, Interview, 1982.
442 Raymond, Report [1876], 265; New Northwest July 20, 1872; Minerals Yearbook 1934, 403; The Mining Journal December 15, 1937, 35.
443 The Missoulian July 3, 1921.

acquired the Amador property. The new ownership erected a 100-ton concentrating mill, apparently replacing an earlier mill at the mine. In 1916, the company completed arrangements to draw electricity from the LaCasse dredge power plant, three miles upstream. At the peak of the Intermountain Company's operation in late 1917, the mine reported an annual total production of 21,263 short tons of ore. It employed a crew of more than 50 men, most of who were housed in the company boardinghouse at the mine site. The mill operated on three eight-hour shifts. Production fell off after 1918 and the mine was shut down in 1921, to reopen only briefly for exploration work in 1951.[444]

The Amador Railway operated from 1906 until 1919 over a crudely engineered track between the Amador mine and the Northern Pacific main line at Amador City. The line hauled ore for the Amador mine and for other lode mines on Cedar Creek. According to railroad historian John V. Wood, the grade was laid along the old pack trail and operated "in a very casual manner" with pack animals having right-of-way as certain points in the canyon were too narrow to allow the passage of both railroad cars and packtrains.[445] The present Cedar Creek road, built during the 1930s, follows the old railbed, with long, gradual curves reflecting the road's earlier purpose. Superior resident Wallace Long studied the Amador road bed, and concluded that it was constructed to minimal standards, using untreated ties and no tie plates. Although the track had fallen into disrepair during the mine shutdown in 1908, it was refurbished in 1909 when the railroad carried the Kansas City Commercial Company's dredge and powerplant equipment from the Northern Pacific, siding to the Amador mine. From the mine, the machinery was hauled over a newly constructed wagon road to the LaCasse placer.[446]

The Amador's rolling stock consisted of one steam locomotive, at least three flat cars, and probably a handcar for track maintenance. The locomotive was a fairly light, not overly powerful rod-type, weighing 95,400 pounds and delivering 16,800 pounds of tractive effort. In railroad nomenclature, it was a 2-6-0--that is, it had two wheels in the leading truck and six driving wheels with none in the trailing truck position. Built by Baldwin Locomotive Works of Philadelphia in 1883, the steam engine was originally owned by the Northern Pacific Railroad and bore the Northern Pacific number 585. It was leased to the Amador Railroad around 1905 and returned to the Northern Pacific around 1919. It remained on that company's roster until June 1925, when it was either scrapped or sold. The Amador flatcars were approximately 40 feet long, equipped for ore-hauling, and were painted black or brick red, bearing the Amador logo. A gasoline

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[444] Westem Mining World March 3, 1900; October 27, 1900; May 4, 1901; Mining World October 17, 1903; January 14, 1904; May 21, 1904; June 30, 1906; August 4, 1906; July 18, 1908; September 17, 1908; April 10, 1909; Mining & Engineering World December 6,1913; April 22,1916; June 19,1915; Mining & Scientific Press February 28, 1903; December 13, 1913; June 24, 1916; October 28, 1916; September 15, 1917; February 23,1918; April 6,1918; May 11, 1918; October 11, 1919; Engineering & Mining Journal May 25,1901; Mineral Resources 1905,/, 256; Mineral Resources 1907, 1, 333; Mineral Resources 1913, 1, 609-610; Mineral Resources 1915,/, 602; Mineral Resources 1916,/, 413; Mineral Resources 1918, 1, 292; Mineral Resources 1919, 1, 523-524; Mineral Resources 1920, 1, 213; Mineral Resources 1925, 1, 651; Mineral County Press August 20, 1914; October 22, 1914; Arthur B. Campbell, Contributions to Economic Geology. Geology and Mineral Deposits, St.Regis-Superior Area. Contributions to Economic Geology. Geological Survey Bulletin 1082-1 (Washington, D.C.: Government Printing Office, 1960), 600-601.

[445]John V. Wood, Railroads Through the Coeur D'Alenes (Caldwell, ID: Caxton Printers, 1983), 109-111.

[446] Long notes; Wood, 109-111; Mining World August 27, 1910; April 29, 1911.

speeder also operated over the line around 1911. The Amador railroad ceased operations in 1919, when ore-hauling was taken over by trucks. The tracks were removed in 1919 or 1920.[447]

Golden Sunset Mine and Mill

The Golden Sunset was among the mines that shipped ore over the Amador Railway. Situated on Mary Ann (formerly Marion) Gulch, three miles south of the Amador mine, the Golden Sunset was located sometime in 1910-1911. It produced mostly gold quartz, with some silver, lead and copper in free-milling ore. The mine initially shipped crude ore via wagon road to the railroad but with the addition of a 25-ton ball mill, the Golden Sunset began shipping concentrates in 1919. Originally milling only four to five tons of ore daily, the mill reached its full 25-ton daily capacity in 1920 with the addition of new equipment. Additional machinery was added in 1921, but little is known about subsequent operations beyond the fact that the mine produced ore in 1939. The principals in the Golden Sunset Mining Company were its president R.W. Ridinger and his partner H.M. Fallis (or Fallus).[448]

American Gold Mine and Mill

Another of Cedar Creek's lodes was the American Gold mine, located just below the LaCasse placer. Described as a "prospect" by the USGS in 1923, the American Gold mine began producing that year and was apparently already equipped with an amalgamation mill. Small lots of gold and silver ore were treated through 1925. In 1926 the mine did only assessment work and some testing on the concentration of lead ore containing gold and silver. The mine was apparently idle from 1930-1931 until the summer of 1937, when James Quarles reopened it. When mining historian Muriell Sibell Wolle visited Cedar Creek during the early 1950s, she sketched the American Gold property showing only several mine dumps, a cabin, and remnants of other structures. Additional information is needed regarding history of the mine since 1926.[449]

Gold Hill Mine and Mill

The O'Neill family, operating as Gold Mountain Mines, Incorporated, worked the Gold Hill mine on Deep Creek in the Trout Creek watershed during the 1920s and 1930s. Area residents frequently refer to the mine as the O'Neill mine. Gold Hill produced gold ore from open cuts, using a dragline, and from a 400-foot adit, equipped with an iron track and ore car. In 1934 the camp contained three cabins and a blacksmith shop. At that time, the operation included an amalgamation and concentration mill equipped with Blake crusher, Forrester rod mill, amalgamation plates, and No. 9 Wilfley table.[450]

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[447] Long notes; Wood, 109-111; Mining World April 29, 1911.
[448] Mineral County Press August 6,1914; October 29,1914; Mineral Independent March 27,1919; July 3,1919; November 13, 1919; August 12, 1920; July 7, 1921; Mineral Resources 1919, 1, 523-524; Minerals Yearbook 1940, 364-365.
[449] Mineral Resources 1924,/, 358; Mineral Resources 1925,/, 651; Mineral Resources 1926,/, 404-405; Wolle, 275.
[450] Mineral Resources 1923,/, 471; Directory of Montana Mining Properties, December 1935, 60.

Because this mill recovered only 60 per cent of ore values, it was replaced in May 1937 with a 75-ton flotation mill, powered by an 85-horsepower diesel engine. The company expanded its mine in 1936-1937, using equipment purchased with a $20,000 Reconstruction Finance Corporation (RFC) loan. According to an industry journal, Gold Mountain was the first Montana mining firm to receive loan money under that New Deal program.[451]

In 1936-1937, Gold Mountain Mines collaborated with Mineral County and the U.S. Forest Service in construction of a road up Deep Creek to the Gold Hill's lower tunnel portal. Later April 1936, the mining company received a $20,000 Reconstruction Finance Corporation (RFC) loan to buy equipment to expand the mine. According to The Mining Journal Gold Mountain was the first Montana mining company to receive an RFC loan.[452]

Russell Corn of Superior worked as a mucker in the Gold Hill in the late 1930s. According to him, the mine employed five miners, paying the going rate of $5.00 per shift. He remained at the mine only a short time, as it was poorly ventilated. The use of air drills and considerable blasty rendered it extremely dusty and the powder smoke made him ill. According to Corn, the mine's ore, an iron-sulphur compound, required smelting, making it unprofitable to mine. The Gold Hill presumably suspended operations sometime between 1938 and 1941, and more research is needed concerning later activity at the site.[453]

Many other hardrock mines operated in the Cedar-Quartz watersheds during the 1884-1940 period. Additional research is needed to determine the duration and extent of these mines and mill operations.

Third Period of Significance: Depression Era Mining Boom, 1930-1941

With the onset of the Great Depression and a subsequent 70% increase in the fixed gold price, placer mining activity boomed throughout the Western United States. The Cedar-Quartz watersheds were no exception. An estimated three hundred prospectors, or "snipers" as they were called, worked the gulches and stream bottoms in search of enough gold to live on. A few found work at resurrected company operations, such as Patten's Big Nugget placer on Meadow Creek and the Covington operation on Big Flat in Oregon Gulch. Most worked on their own, using the most basic hand-labor methods. Although some Depression-era snipers had received training in placer techniques through government programs, many had little or no experience. Fern Gildersleeve recalled that while the established miners were willing to teach the greenhorns, they nonetheless kept a very close eye on their own sluices and equipment during this period. The snipers lived in tents or in shacks built with lumber torn from old flumes. Jack Viche remembered one camp along Cedar Creek as 'the most damndest shanty town -you ever seen." They traded their small amounts of gold at the store in Superior

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[451] The Mining Journal January 30, 1937, 24; May 15, 1937, 26.
[452] The Mining Journal February 29, 1936, 24; April 15, 1936, 23; July 15, 1936, 25.
[453] Russell Corn, Interview, 1982.

and supplemented this meager income with woodcutting, hunting, trapping, and fishing. Poaching was common and generally tolerated by the authorities. Less tolerated was bootlegging, which many snipers found more profitable than mining. According to Viche, illegal stills were numerous in the Cedar-Quartz area, prompting at least one raid by local law enforcement. In 1934, many young men found work with the Civilian Conservation Corps (CCC) which established a camp at the mouth of Trout Creek. Fire-fighting, and trail and road construction were the Trout Creek CCC's major activities in the area. CCC crews built the first road up Trout Creek and a spur to the Deep Creek mines in 1935. Prior to this, the mines on Trout Creek could only be reached by a rough trail up the Creek or over the ridges from Sunrise and Cedar Creeks. The CCC also re-routed the Cedar Creek road above Cayuse. During the disastrous floods of 1933-1934, the road, which had run along the creek bottom, was almost entirely washed out, interfering with access to many mining properties. The CCC crews rebuilt the road along the southern slope above the stream, incorporating the old Amador railroad grade and LaCasse wagon road.[454]

HISTORY OF THE NANCY LEE MINES
By : Timothy F. Light & Mary C. Horstman

Iron Mountain-Keystone Historic Mining District

The discovery of placer gold on Cedar Creek in 1869 ignited the last of Montanas major mining stampedes, attracting several thousand prospectors to the Cedar, Trout and Quartz Creek watersheds during the summer of 1870. The most promising diggings were quickly claimed, causing latecomers to explore other tributaries along the Middle Clark Fork in search of gold. The area surrounding Keystone and Flat Creeks (north of present-day Superior, Montana) was undoubtedly among the areas investigated and was the scene of sporadic placer activity during the 1870s and 1880s. Because the emphasis was on easily worked placer deposits during this period, prospector frequently identified but did not develop promising quartz lodes. With the expansion of Montana's economy and population in the early 1880s, greater amounts of capital were available for investment in the mining industry. Coinciding with this, the completion of the Northern Pacific Railroad's transcontinental line through Missoula in 1883 and improvement in area roads provided miners with greater access to hardrock mining equipment and made it possible for them to ship crude ore or concentrates to smelters as far away as Omaha, Nebraska. These advances paved the way for development of lode mines on the tributaries of the Middle Clark Fork, including those in the region encompassing the Flat Creek and Keystone watersheds.

Quartz lodes were discovered in the Keystone watershed (then known as Spring Gulch) sometime prior to 1886. By summer 1886, work was underway on several mines. Within the next year, at least six claims had been located and filed: Yellow Jacket, King Solomon, OR & N, Keystone, Iron King, and Iron Queen.[455] Numerous other lodes

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[454] Fern Gildersleeve, Interview, 1991; Jack Viche, Interview, 1982; Childress notes; Hahn, 47, 62-63, 75; Mines Magazine, January 1934, 17; Directory of Montana Mining Properties, December 1935, 60-61; Russell Corn, Interview, 1982

[455] The *Weekly Missoulian* 1887:19 August.

were under active exploration, and the Spring Gulch district eventually encompassed dozens of claims, including the Broken Hill, Vulcan, Eldorado, Swastika, Iron Mask, Mountain Glen, Little Anaconda, Glen Metals, and the Little Pittsburgh. The Spring Gulch mines produced ores containing high concentrations of silver, lead, copper and zinc, along with smaller amounts of gold.[456]

The activity in the Spring Gulch mines during the late 1880s spawned a community of between 300 and 500 people in a small basin formed by Spring Gulch at the mouths of Pack, Firman, Mill and Brian Gulches. Known as O'Rourke in its earliest days, the camp was named Carter sometime around 1890, after Senator Thomas H. Carter assisted the residents in procuring a post office. The name also attached itself to the Spring Gulch mines, which became the Carter mining district. Nearly abandoned during the 1893 silver crash, the town soon revived with the resurgence of mining activity, sustaining a small but dwindling population until the 1930s. In 1910, in order to end confusion with another Montana town of the same name, Carter was renamed Keystone.[457] Within a few years the mining district was known as the Keystone district and Spring Gulch itself had been relabeled Keystone Creek.

In the nearby Flat Creek watershed, hardrock mining began in 1888 with the discovery of the Iron Mountain silver-lead lode by Frank Hall and D.R. Frazier.[458] Prominent mining engineer J.K. Pardee took an immediate interest in the property and organized the original Iron Mountain Company in January 1889. Other principals in the company included several Helena capitalists, most notably banker and lumberman Anton M. Holter.[459] The involvement of men like Pardee and Holter in the Iron Mountain and Spring Gulch mines alerted investors to the potential of other mines in the area, such as the Little Anaconda mine. Situated in Deep Gulch on present-day Pardee Creek, the Little Anaconda was capitalized in 1890 by a syndicate of Missoula businessmen that included C.H. McLeod (of the Missoula Mercantile Company and Montana Improvement Company) and Missoula mayor J.M. Keith.[460]

In an era dominated by the silver giants of Butte and Philipsburg, the Iron Mountain ranked as one of the states' leading silver producers from 1889 until shortly before its closure in 1898. Ore from the mine initially was packed by mules over the mountains north of the mine and down to the Clark Fork River, where it was transferred to barges and floated downriver to Paradise for railroad shipment to the smelter at East Helena.[461] With the completion of the Coeur d'Alene branch of the Northern Pacific Railroad through Superior in 1890 and the construction of a 50-ton concentrator near the mine in 1891, the need for the Paradise ore route was eliminated. The Iron Mountain

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[456] Mining & Engineering World 1911:23 September.

[457] Lindeman, Glen W., Craig Holstine, Ruth Anne Masten, and Glen D. Hartmann, *1984. A Cultural Resources Survey of the Bonneville Power Administration's Gardson-Taft 500 kV Transmission Line Project, Western Montana.* Archaeological and Historical Services. Eastern Washington University Reports in Archaeology and History. Eastern Washington University, Cheney., pp. 222-225.

[458] Sanders, Helen Fitzgerald, 1913. A History of Montana. 3 vols. Chicago: Lewis Publishing Company., vol. 1, pp. 468-469.

[459] Wolle, Muriel Sibell, 1963. Montana Paydirt: A Guide to the Mining Camps of the Treasure State. Athens, Ohio: Swallow Press., p. 274.

[460] Engineering & Mining Journal 1890: 27 December.

[461] Wolle, Montana Paydirt: A Guide to the Mining Camps of the Treasure State., p. 274.

freighted its concentrates by wagon to Superior for rail shipment.[462] By 1893, the mine itself was equipped with an electric plant, a tramway, and its own one-and-a-half mile railway connecting the mine to the mill.[463] So profitable was the Iron Mountain operation, that it continued to operate through the precipitous drop in silver prices that crippled the silver-mining industry and unleashed the Panic of 1893[464] Even after the Iron Mountain Company ceased operations in 1898 (due to difficulties presented by the mine's great depth and by a Montana law requiring an escape opening independent of the main shaft),[465] subsequent operators mined and milled the Iron Mountain and neighboring lodes for much of the next three decades.[466]

The Iron Mountain mine gave birth to the camp of Pardee in 1889. Located in the canyon at the head of Flat Creek, Pardee was home to roughly one hundred mine, mill, tram and railway workers employed by the Iron Mountain Company, as well as an unknown number of merchants, saloonkeepers, and the other usual residents of a mining camp.[467] The activity at Iron Mountain also had a pronounced influence on the development of Superior. As the mine flourished and expanded, the town's new construction concentrated on the north side of the Clark Fork near the mouth of Flat Creek. When A.P. Johnston moved the Superior post office from the south side of the river to Flat Creek in 1889, much of the town's business district followed.[468]

The Nancy Lee Mines Group

The present-day Nancy Lee group of mines comprises several of the earliest Spring Gulch claims. The Keystone, Iron King, and Iron Queen claims were filed in 1887 by a partnership made up of Philip O'Rourke, W.B. White, John C. Cromie, Harry Boyer, and Patsy Finnegan. Frank Tibbals was a partner in the Iron King and Iron Queen, but apparently not the Keystone.[469] In 1891, the Keystone & King Mining Company (also known as the K & K Mining Company) was formed, but was reorganized the following year as the Keystone and King Mining and Milling Company. Trustees in the new company included O'Rourke, Cromie, and Tibbals as well as a group of prominent businessmen that included Helena capitalist Anton M. Holter, Missoula mayor and banker J.M. Keith, businessman George B. McAuley, and future U.S. Senator (Oregon) Jonathon Bourne.[470]

Keystone Mine

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[462] Engineering & Mining Journal, 1915:27 November.
[463] Iron Mountain Mining Company, 1893-1900. Annual Report of the Board of Trustees. Helena, Montana. Holter papers, Montana Historical Society Archives., 1893: 4-8.
[464] Ibid., 1895:1-7.
[465] Luke, R.A., 1898. Letter to Iron Mountain Company Shareholders, February 10, 1898. Anton M Holter papers, Montana Historical Society Archives, Helena, Montana.
[466] Hale, R.S., 1906. Letter to Iron Mountain Company Shareholders, March 21, 1906. Holter papers, Montana Historical Society Archives, Helena.
[467] Wolle, Montana Paydirt: A Guide to the Mining Camps of the Treasure State., p. 274.
[468] Stout, Tom, ed., 1921. Montana: Its Story and Biography. 3 vols. Chicago: American Historical Society., p. 413.
[469] Mineral County, Montana, County Clerk's Office. Deed Records Vol. A, 165-170.
[470] Koelbel, Lenora., 1972. Missoula the *Way It Was:* A Portrait *of* an *Early* Western Town. Missoula: Pictorial Histories., p. 42.

Prior to 1893, the Keystone mine was the district's leading producer. Under the direction of mine superintendent John Cromie, one of the original Keystone & King partners.[471] Ore was shipped to the United Smelting Company at East Helena for treatment. By 1893, the Keystone and King company was also engaged in development work on the Iron King mine, and plans were underway for construction of a 50-ton concentrator to process ore from both mines.[472] However, the catastrophic 1893 crash in silver prices and the resulting nationwide economic crisis--the "Panic of 1893"--forced the widespread shutdown of silver mines throughout the West, and the Spring Gulch mines were no exception. Work was halted at the Keystone by October 1893,[473] and the mill was never built. William Bryan leased the mine in late 1893, working it with a force of 16-19 men, but this operation was short-lived.[474] The mine apparently ceased production sometime in 1894, and was still inactive when the U.S. Geological Survey examined it in 1905.[475] In 1936 the property was among those claims consolidated under the Nancy Lee Mines, Inc.[476]

Iron King, Iron Queen, and Ivanhoe Mines

Operated by the Keystone and King Company at least through 1893, both mines were managed by Olaus Jeldness, a Norwegian mining man, at least through 1891. The Jeldness shaft at the Iron Queen bears his name, and apparently was constructed during his tenure as superintendent.[477] Jeldness also worked the Little Anaconda mine in 1892. Little is known about activity at the Iron King & Queen between 1893 and 1905. Presumably they, like other silver producers, closed in 1893 as a result of deflated silver prices and the Panic of 1893. Although details regarding the transfer of the mine from the Keystone & King Company to the King & Queen Mining Company are unclear, it appears that there may have been a falling-out among the Keystone & King partners. In 1908, John C. Cromie, one of the original K & K partners, was involved in a dispute with the King & Queen Company. Cromie claimed that the lands encompassing the King & Queen claims and a portion of the Carter townsite should be classified as non-mineral agricultural land rather than mineral land.[478] Although the local land office decided in favor of Cromie, and the General Land Office in Washington, D.C. upheld the decision, the mining company apparently prevailed, for operations resumed in late 1909.[479] In 1910, the King & Queen Company leased the mine to C. B. McKennon, who successfully worked the mine with a twelve-man crew.[480]

When the King & Queen Company resumed control in 1911, the property was the largest producer in the Spring Gulch district.[481] A wagon road 3 1/2 miles long

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[471] Mineral County, Montana, County Clerk's Office. Deed Records Vol. A, 165-170.
[472] Engineering & Mining Journal, 1893:13 May, 447.
[473] Ibid., 7 October, 379.
[474] Ibid., 2 December, 576.
[475] Campbell, Arthur B., 1960. Geology *and Mineral Deposits of* the St. Regis - Superior Area, *Mineral County, Montana.* Contributions to Economic Geology. Geogolical Survey Bulletin 1082-1. Washington, D.C.: Government Printing Office., p. 593.
[476] Engineering & Mining Journal, 1893:1 April 303.
[477] Ibid., 1890: 1 March, 257.
[478] *Mining World* 1908: 3 October, 540-541.
[479] Mineral Resources 1909:1, 383.
[480] Report of the Inspector of Mines 1910:110-112.
[481] Mineral Resources 1911: 1, 640.

connected the mine to the Ashmore siding of the Chicago, Milwaukee & St. Paul Railway.[482] The mine's surface plant included compressor equipment capable of operating six drills, as well as a sawmill near the minesite. Timber on the claims provided both lumber and firewood. Although the USGS reported that King & Queen ore was roasted before shipment in 1909, there is no indication Whether this took place at a mill facility on or near the minesite[483] The following year, the *Engineering & Mining Journal* noted that a concentration mill was planned for the mine, but it does not appear that construction began until 1912.[484] Designed for the treatment of lead-silver ore, the mill began operations sometime in 1913. By 1914 it was capable of processing 125 tons of ore daily. The mine's copper-lead sulphicle ore was not run through the mill, but was shipped directly to the smelter in East Helena.[485]

In February 1917, the Iron King, Iron Queen, and Ivanhoe properties were taken over by the newly incorporated Pitt Copper Mining Company.[486] The following year Pitt Copper patented the Iron Chief and Chieftain claims which largely overlap the present-day Nancy Lee claims. Little is known of the Iron Chief and Chieftain prior to their patenting in April 1918, other than that the Iron Chief included the King & Queen millsite. The claims' plat indicates a tramway connecting the Ivanhoe adit to an ore bin and the concentration mill, which also housed a sawmill. Other structures on the Iron Chief claim included an office building, assay office, three cabins, a house, a woodshed and a pumphouse. The mill at this time had a reported capacity of 100 tons per day but, according to the USGS, it was inactive in 1918. The mines were then producing mostly sulphide copper ore which was shipped in its crude state to the East Helena smelter.[487] A local source states that production from the King & Queen group ceased after 1918, with the mines remaining virtually inactive for nearly ten years. In 1928, Amalgamated Metals Mines Co. performed development work on the King & Queen group, shipping a test-load of lead-zinc ore to the Timber Butte mill at Butte for custom milling.[488] However, there is no record of production or other activity at the mine until 1936 when the Iron King, Iron Queen, and Ivanhoe were consolidated with other holdings by the newly formed Nancy Lee Mines, Inc.[489]

OR & N. Mine

Along with the Keystone, Iron King, and Iron Queen, the OR & N was one of the original six claims worked in the Spring Gulch district in 1886-1887. Its name is taken from the initials for the Oregon Railway and Navigation Company, a company created by railroad tycoon Henry Villard through the merger of the Oregon & California

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[482] Ibid.,
[483] Ibid.,1910: 1, 494.
[484] Ibid.,*1912:1, 767.*
[485] Ibid.,*1911:1, 640*
[486] Pitt Copper Mining Company, 1917. Articles of Incorporation, February 29, 1917. Mineral County Clerk & Recorder's Office, Superior, Montana.
[487] Mineral Resources 1918:1, 295.
[488] Ibid., 1928: 1, 597.
[489] Mining Journal 1936: 15 May, 23;

Railroad and the Oregon Steamship Company.[490] In 1889, mine owners J.R. Hargrave and E.W. Park sold the property to the newly formed OR & N Mining Company. The company was incorporated by a group of Helena businessmen that included hardware and lumber executive Martin Holter (brother of banker and Keystone mine backer Anton M. Holter), banker and Helena mayor T.H. Kleinschmidt, H.M. Pardee, and E.W. Beattier. Another heavy investor in the company was James K. Pardee.[491] A mining engineer, Pardee had come to Montana to develop mines in the Philipsburg area in 1874, and remained to play an important role in Montana mining history for over two decades. Pardee was instrumental in the development of the Iron Mountain mine on Flat Creek, southeast of Spring Gulch, and the camp of Pardee was named for him.[492]

By 1890, the OR & N's numerous shafts, levels and crosscuts had exposed large quantities of high-grade silver, copper, and lead ore. It was the early success of the OR & N that inspired owners of neighboring claims to develop their properties in the hope of reaching similar deposits.[493] OR & N operations continued through 1891, with ore being shipped to a smelter in Omaha, Nebraska, however, the older workings in the mine had been abandoned, and only seven men were employed on drifts from the mine's lower tunnel.[494] Little else is known about the OR & N operations until December 1910, when the State Inspector of Mines reported that it was the property of the Coeur d'Alene Independent Consolidated Mining Company, based at the nearby town of Carter. C. Povleg was the company's general manager and Antone Tamietti, of an early day Superior family, was its foreman. The mine was worked through a 1,700-foot tunnel and a total of 4,000 feet of workings, producing sulphide copper/silver/lead ore. In 1912 the State Inspector recorded the OR & N's ownership as the Coeur d'Alene Investment Company, managed by E. Lewis and worked by a crew of eight.[495] The OR & N remained active through 1915, but little is known about its operation between 1915 and 1936, when it was consolidated with other Spring Gulch properties into the Nancy Lee Mines, Inc. holdings.[496]

Eldorado Mine

Located just west of the OR & N was yet another significant group of claims comprising the Eldorado mine. Originally two conflicting claims, the William Tell and the Blue Dick, the Eldorado property was organized to resolve the longstanding dispute between the respective claimants. In late 1890 or early 1891, the Eldorado Mining Company was incorporated by E.M. Tower, Henry Bernard, Thomas J. Lapp, August Herzog, Lyman C. Mosier and M.E. Rutherford.[497] Few details are available concerning the Eldorado operation after 1892, when the State Inspector of Mines reported it among the principal mines of the Spring Gulch district, and it was likely a

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[490] Seckinger, Katharine Villard, ed., 1983. The Great Railroad Celebration, 1883: A Narrative by Francis Jackson Garrison. In Montana Magazine of Western History, Summer 1983.
[491] Engineering & Mining Journal 1889: 22 June, 574.
[492] Philipsburg Mail 1914: 22 May, 1.
[493] Reports *of* the Inspector *of Mines 1891*:63.
[494] Third *Annual* Report 1891:53.
[495] Report *of* the State Inspector 1912:88.
[496] Ibid.
[497] Engineering & Mining Journal, 1891: 17 January, 98.

victim of the 1893 silver crash. In 1936, it was included in the consolidation of mines forming the Nancy Lee properties, along with the Keystone, OR & N, Iron King & Queen, Broken Hill and Peter the Great Claims.[498]

Nancy Lee Mines, Inc.

Incorporated in Idaho in 1936, Nancy Lee Mines, Inc. consolidated the former King & Queen group, the Keystone claims, the Eldorado group, the OR & N holdings, the Broken Hill, and the Peter the Great property into a single operating unit. Employing 15 men under the management of Max R. Crosby and Milo Skero, the mine was equipped with a 375-foot semi-Diesel-powered compressor and two machine drills. The firm's initial objective was the reopening of the King & Queen workings by means of an ambitious tunnel project.[499] By September of that year, two crosscuts were being driven, one to cut the King & Queen veins and a second driven to the north to cut veins in the Eldorado, Keystone and Peter the Great claims.[500] In October miners succeeded in unwatering the old Jeldness shaft at the King & Queen. Work was interrupted during the winter of 1936-1937, when Nancy Lee Mines, Inc. undertook legal action to quiet title to its holdings and the company itself was reorganized. As the result of a May 17, 1937 Mineral County district court decree, the Nancy Lee secured title to 12 patented lode claims and 55 unpatented claims, making it one of the largest consolidated mining properties in the Northwest. Nancy Lee Mines, Inc. expanded further in July 1937 with the acquisition of the Little Pittsburgh Mining Company, including the Little Pittsburgh claims on Slowey Gulch. Operations were again halted following the consolidation as the Nancy Lee company complied with Securities & Exchange Commission requirements regarding the issuance of new stock. Work resumed in late 1937' with operations directed by general manager Henry H. Ray (formerly of Benguet Consolidated Mining Company in the Philippines), operations manager Max R. Crosby, and mine superintendent Milo Skero. Alexander Leggatt, of an old Butte mining family, and Frank Eichelberger, vice-president of Sunshine Mining Company, were consulting engineers.[501]

Following the merger of the Little Pittsburgh properties into Nancy Lee Mines, Inc., the company concentrated most of its efforts for the next five years on reopening the Little Pittsburgh mine, reclaiming and extending the old Keesey tunnel to connect with the Little Pittsburgh shaft. A modern mucking machine, new mine rails, mine cars, and water pipe were installed at the mine as part of the reclamation project. This tunnel work was frequently confused in the trade journals with the company's King & Queen tunnel project. By June 1938, 2,600 feet of tunnel and 80 feet of raising had been completed, connecting the tunnel with the winze in the Jeldness shaft of the King & Queen.[502] Mining publications referred to both as the "Nancy Lee tunnel", without

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[498] Mining Journal 1936: 15 May, 23.
[499] Ibid.
[500] Northwest Mining News 1936: 17 September, 6.
[501] Mining Journal 1937: 15 April, 30
[502] Mining Journal, 1938: 30 May, 26

LINCOLN
FLATHEAD
SANDERS
LAKE
MINERAL
MISSOULA
GRANITE
RAVALLI
DEER LODGE
SYLVANITE
TOBACCO RIVER
RAINY CREEK
WOLF CREEK
STAR MEADOW
TROY
Libby
LIBBY
Kalispell
BLUE CREEK
CABINET
TROUT CREEK
SILVER BUTTE
HOG HEAVEN
ELMO
Polson
WHITE PINE
THOMPSON RIVER
Thompson Falls
SEEPY CREEK
PROSPECT CREEK
CAMAS PRAIRIE
PACKER CREEK
DENEMORA
ROCK ISLAND
PLAINS
KEYSTONE
ST. REGIS
SPREAD GULCH
REVAIS CREEK
Superior
IRON MOUNTAIN
NINE MILE CREEK
SEELEY
BOB MARSHALL
CEDAR CREEK
PETTY CREEK
Missoula
MISSOULA
POTOMAC
COPPER CLIFF
ELK CREEK
COLUMA
CLINTON
BIG BLACKFOOT
CRAMER CREEK
GARNET
FINN
WOODMAN
EIGHTMILE
NORTH BITTERROOT
THREEMILE
WELCOME CREEK
ALPS
COMBINATION
CURLEW
PLEASANT VIEW
BURNT FORK
ROCK CREEK
PIONEER
Philipsburg
RACETRACK
ANTELOPE CREEK
Hamilton
LOST CREEK
Anaco
SAPPHIRE
BITTERROOT
MOOSE LAKE
HEBER
FROG POND BASIN
FRENCH GULCH
GERMAN GULCH
SULA
WISE RIVER
FLEECER MOUNTAIN
SLATE CREEK
PIONEER
HUGHES CREEK
MINERAL POINT
Memoir 15 district - mining district boundary interpreted from MT Bureau of Mines & Geology Memoir No. 15, Plate 1; district numbering is from Sahinen (see NOTES).
New district - located and named by the Abandoned Mine Reclamation Bureau (AMRB), Montana Dept. of State Lands to facilitate mine inventory
Memoir 15 district boundary not used by the AMRB.
Stream
Highway
County Line
Outside of Region 6
National Forest
National Park
Indian Reservation
Scale of Miles
0 10 20 30
Albers Equal Area Projection, centered at 109.5 W, standard parallels at 46 and 48 N.
REGION 6
III - 113 - MAP 6
Montana State Library
Natural Resource Information System
99nris494-6 - April 19, 1999

distinguishing between the Little Pittsburgh and King & Queen properties, making it difficult to follow their progress with any accuracy.

With the outbreak of World War 11 in 1941, Nancy Lee officials turned their attention from the silver-lead deposits of the Little Pittsburgh toward the lead-zinc-copper ores of the King & Queen and other claims "on the Keystone side of the property". A government defense minerals purchasing program made development of these deposits financially attractive, and a 1943 federal loan enabled the company to reopen and re-equip old workings in the King & Queen group, as well as two other nearby claims. By September 30,1943 production from the King & Queen was underway.[503]

In 1944, Nancy Lee Mines, Inc. turned over operations of both the Little Pittsburgh and King & Queen groups to other parties. In May, the Pittsburgh Silver Mining Company acquired the Little Pittsburgh and Vulcan groups. The company had been organized for the purpose by Eugene Keesey of Kellogg, Idaho, who had originally owned the Little Pittsburgh during the 1920s.[504] In August the Nancy Lee Company granted a 10-year lease on the King & Queen and adjoining claims to Ernie G. Smith of Osburn, Idaho.[505] The results were so encouraging that Smith began construction of a mill near the mouth of Slowey Gulch in the summer of 1945. With the completion of the building, Smith trucked -mill equipment to the site from Wallace, Idaho where it had been stored. The initial mill unit, designed to handle lead-zinc ores, had a 100-ton daily capacity and was in operation before the end of 1945. Ore was hauled by truck to the Slowey Gulch mill site from the King & Queen site. During 1945, Smith mined 1,811 tons of lead ore from the King & Queen's upper workings through the Nancy Lee tunnel. The entire tonnage was processed in the Slowey mill, resulting in 40 tons of lead concentrates containing 1 oz. gold, 990 oz. silver, 1,466 lbs. copper, 49,224-lbs. lead, and 4,280 lbs. of zinc.[506]

The mill was apparently improved in early 1946 to handle copper ore as well as lead-silver-zinc material. After April 1946, the Slowey mill was described as a 120-ton flotation mill.[507] New construction also was underway at the mine, where a fire had destroyed the compressor plant in March. In spite of the delays for the replacement of the compressor, the crew of 18 miners maintained a daily production of 100 tons of ore By September 1947, the Slowey mill's flotation capacity had been boosted to 125-tons daily, with a 250-ton crushing capacity. Zinc concentrates were shipped to the Bunker Hill & Sullivan plant at Silver King, Idaho and lead concentrates were sent to the smelter in East Helena, Montana.[508]

By January 1948 the Slowey mill operated two shifts and was increased to three later in the year, with 20 men employed in the operation. The Smith operations encountered some problems in 1948, as soft, heavy ground hampered mine development and

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[503] Ibid., 1943: 30 July, 25.
[504] Mining Journal 1944: 15 May, 30.
[505] Ibid., 1944: 30 August 26.
[506] Idid., 1945: 30 July, 26.
[507] Mining World 1946: 1 April, xxvii
[508] Mining World 1947: September, 69.

production, and difficulty in eliminating arsenic from zinc concentrates interfered with mill production. The following year, Smith opened an old tunnel--now known as the Lower Tunnel--125'downslope from the Nancy Lee tunnel, and installed equipment its extension. He also worked the dumps of the Iron Mountain mine on Flat Creek, hauling 5,110 tons of zinc-lead ore from Iron Mountain to the Slowey Gulch mill for treatment, along with 5,500 tons of zinc-lead ore from the King & Queen groups. A severe winter curtailed mill operations in early 1950. Cold weather froze the raw-ore stockpile and disrupted the wet-milling operation, interrupting the processing of a 3,500-ton stockpile of silver-copper-lead ore, and forcing the suspension of aboveground work until March.[509]

In August 1950, Nancy Lee Mines, Inc. decided to suspend Smith's leases and undertake development of the lowest level in the King & Queen group. Smith's remaining leases, his equipment and his 125-ton flotation mill were to be taken over by the company which would then repay Smith over a period of years with a percentage of mine profits Between 1950 and 1953, Nancy Lee Mines Inc. rehabilitated the old 1,700-foot Lower Tunnel, and extended it an additional 800 feet to a promising silver-lead orebody. The company also completed new camp buildings and improvements to the mine's water supply system. As company operations expanded in 1951, the company added a larger compressor at the mine and additional equipment at the mill to increase its capacity, and extended the power line from the mill to the mine.[510] During this time, the Slowey Gulch mill continued to work zinc-lead ore from E.G. Smith's Iron Mountain and upper King & Queen operations on a custom basis, as well as old tailings and some Nancy Lee development ore.[511]

From 1953 through 1957, little if any production was reported from the Nancy Lee holdings. Those mine operations that did occur were largely related to exploration and development, although some ore was shipped in 1955. The mill continued to process E.G. Smith's Iron Mountain ore. In May 1958 it was reported that the former lease operator, E.G. Smith, with financial assistance from the Nancy Lee Mines, Inc. would reopen and deepen the Nancy Lee workings.[512] For the next two years, Smith rehabilitated 3,500 feet of tunnel and sank a 250-foot two-compartment shaft from the 640-foot level to the ore body previously worked in 1955. After the work was completed in March 1960, Smith again leased the Nancy Lee workings from Nancy Lee Mines, Inc. and proceeded to drive crosscuts to develop new orebodies. The flotation plant, which last operated in 1953, was upgraded to improve its copper recovery and began shipping concentrates to the ASARCO East Helena smelter in August 1960.[513]

REGION 7

[509] Mining Journal, . 1950: January, 61
[510] Mining World, 1950: November, 68.
[511] Minerals Yearbook 1950:1532.
[512] Mining World, 1958: May, 71.
[513] Mining World, 1960: August, 55.

In the west central portion of the state is the area known by some as the Golden Triangle. This designation reflects that fact that the area between Helena, Philipburg, and Butte, had the most productive ore is the State. This area is also in the center of region 7. With this region the districts are pact together and the hsitories are connected to the point of confusion. We will not make an attempt here to separate all the districts out and deal with them as was done with other regions. The following context will give an understnding of some of the major districts and the associted districts in there vacinity.

HISTORIC BACKGROUND ON SPRING HILL MINE (HELENA)
By: GCM

In 1864, a small group of men headed north from Alder Gulch for the rumored riches of the Kootenai. Along the way they met a disillusioned miner named James Coleman who was returning from the Kootenai mines. The group was convinced to change their plans and decided instead to prospect the Little Blackfoot where one of their number had found colors the year before. Although they traced the river to its headwaters and crossed the divide into Prickly Pear Creek, the party found only colors and no paying gravel. Again changing their strategy, the party decided to prospect to the north. After six weeks of effort with little to show for it, the company returned South to the best of the earlier prospects on what they dubbed Last Chance Gulch. On July 14, 1864 they dug two prospect pits on Last Chance Gulch upstream from their previous efforts. Both pits revealed flat gold nuggets and gold dust. The Last Chance Gulch discovery is generally credited to John Cowan, Reginald (Robert) Stanley, J. D. Miller and John Crabb. Later, these men would be known as the "Four Georgians". Their numbers were augmented by Coleman and Captain George J. Wood, who arrived in time for the first clean up, liked what they saw, and decided to stay. Since they had the gulch to themselves, they tested up and down the stream to find the richest ground. They held a miners meeting allowing 200 ft per claim; with individuals other than the original discoverers limited to one staked claim and one purchased claim. Eventually, Crabb and Cowan were dispatched to Virginia City for supplies and the Last Chance bonanza period began.[514]

Perhaps for the first time in history, the discoverers of a bonanza were able to obtain provisions without a stampede of men following their tracks back to the new diggings. A few close friends were given the least possible information, but word still spread. Throughout the summer of 1864 small parties of miners left Virginia City and made their way to Last Chance Gulch. Other miners, who were roving the hills prospecting, came upon the modest camp and stayed on to stake their own claims. But those who came stayed. Only a chronic lack of water limited the amount of gold that could be taken from the gulch.

John Cowan built the first of five cabins, which comprised the fledgling camp in early October of 1864. By mid-October 200 votes were cast in an election for representatives

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[514]Malone, Michael P. and Richard B. Roeder, 1976. Montana: A History of Two Centuries, University of Washington Press, Seattle.

in the Territorial Legislature, and by the end of the month the camp had grown enough to take on the title of "town". In a contest between the names Helena and Tomah, Helena won by two votes. The International Hotel opened its doors on the comer of Main and Bridge (State) Streets in November of 1864. The population continued to grow, 1000 souls lived in Helena in March of 1865, but by midsummer that figure had tripled. The completion of the Chessman and Cowan Ditch in 1865 allowed the gold to be sluiced at an even faster rate. The end of the Civil War and the continued success of the mines combined to set off yet another stampede from the eastern states in 1866. By 1867, at the height of the bonanza period, the town held as many as 4, 100 to 7,500 people, mostly men between the ages of 25 and 40. As the paying gravels in Last Chance Gulch were taken up, miners fanned out and began working Grizzly, Orofino, and Dry Gulches, but none of these could match the incredible riches of Last Chance Gulch. The Four Georgians sold out in 1867 and it was said that a heavy wagon had to be used to haul their gold dust back to civilization. By 1868, only four years after the discovery, nearly all the sluices were gone from Last Chance Gulch and a city stood on the played-out placers. In 1869 the Chinese worked the few remaining placers in the gulch.[515]

Captain John Wood surveyed the townsite of Helena in 1865. Streets followed the chaotic paths of the early miners, wound around claims and followed the tortured and distorted streambed. As a result, few city blocks matched the ideal of 30 x 60, rather they formed a variety of shapes and sizes. Major streets often came to abrupt ends. Structures built on paying gravels were propped up with stilts as the gavel under their foundations was swept away. The town was kept in a constant state of rebuilding by a series of devastating fires: April 1869, November 1869, October 1871, August 1872 and January 1874. These fires left a legacy of stone and brick fireproof buildings in the gulch. When excavations for these buildings were made, jokers watching the proceedings would begin to pan and then announce a dollar to the yard in return. A story is also told of a Chinese man who drifted under Main Street from his place of business to obtain an additional source of income.[516]

Although streets and buildings covered the played-out placers, the tally for the district continued to grow in the mining literature. Knopf (1913) traced an amazing inflation of the total production figures. The first available totals were published in 1883 when a German journal estimated the total to be around $ 10 million. Bancroft in 1889 placed the figure at $16 million; Swallow in 1890 upped the ante to $30 million and by 1913 Knopf reported others using a $35 million figure. A more moderate figure used by Wolle (1963) credits Last Chance Gulch with $7 million in gold, Grizzly Gulch with $5 million, Dry & Tucker Gulches with $3 million and Nelson Gulch with $2.5 million.[517]

Lode mines of the district provided a more enduring, albeit less glamorous, source of gold. As placers were taken up in Last Chance and the nearby gulches, miners moving

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[515]Lyden, Charles J., 1948. "'Me Gold Placers of Montana", Montana Bureau of Mines and Geology Memoir 26. Montana School of Mines, Butte.

[516]Ibid.

[517]Knopf, Adolph, 1913. "Ore Deposits of the Helena Mining Region, Montana", US Geological Survey, Bulletin 527, Vol. 1, p. 92.

south discovered lode deposits: the Whitlach-Union mine in Oro Fino Gulch and, later, the Spring Hill mine in the adjoining Grizzly Gulch. Lode mining was limited almost entirely to these two mines.[518]

Lode mining activity in the district centered on the development of the Whitlach-Union from whence the town of Unionville sprang up; later activity centered around the Spring Hill mine. The Spring Hill mine was second only to the Anaconda Company in gold production for Montana in 1929. Other mines in the district included the Yellowjacket, Big Indian Oust over the divide to the east in the Montana City district and the Dutro or Old Dominion. A small 20-stamp mill was erected at the Whitlach mine in 1905. The Arrowhead & Old Dominion mill was reported in 1912 to consist of a 2-ton stamp mill. The Northwestern Metals 40-ton mill was built in 1912 to treat waste dumps and tailings through a dry chlorination process. Other mills were constructed at Unionville and eventually at the Big Indian. A mill at the Spring Hill mine was built in 1925 and operated until it burned in 1932. It was replaced in 1934 and operated until the operation was shut down in 1940.[519]

Activity in the southern portion of the district began to slow down during the 1930s and had ended, except for intermittent local activity, by 1940. Pardee and Schrader (1933) estimate the total production of the Helena district to the end of 1928 to be $22,500,000. This includes an estimated $16,000,000 for the placer deposits, $6,110,000 for the Whitlach-Union and Big Indian lodes up to 1911, and $390,000 for production for all the other mines in the district, primarily the Spring Hill mine which in 1928 produced $62,502.84.

In 1938 the Helena placers again began to bring forth gold as the Porter Brothers Corporation's electric Yuba dredge began to work the flats north of town. From November of 1935 to August 1943 the dredge worked continuously on the flats. In that time 45,000 ounces of gold were recovered from gravel that averaged 18 to 30 cents per cubic yard. A second dredge, the PerrySchroeder, was active in 1940 and 1941 and its totals included in the total gold recovery. Dredging stopped in 1943 due to the war-time restrictions on gold mining. When this ban was lifted in 1945, the Porter Brothers dredge worked one more season. Total value of the gold from this dredge was reported to be more than $2,500,000.[520]

In 1930, the Spring Hill mine was Montana's foremost gold mine. Yet, in spite of this preeminent status, the mine never achieved its full potential. An all-too-common combination of difficult ores, fires, labor problems, war-time restrictions on gold mining, poor management and ineffective mining methods all conspired to make the Spring Hill mine, over its lifetime, a losing venture. The operation was a case-study

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[518]Anderson, Paul and Barbara Sommer, 1990. Preservation Planning Overview for Phase 25 of Projects 25, 26, 27 and 28: Parts One and Two. Report prepared for the Montana Department of State Lands, Helena, by GCM Services, Inc., Butte.

[519]Hall, J. H. and M. L. Rickman, 1912. Montana Bureau of Agriculture. Labor and Industry. Thirteenth Report. for years 1911 and 1912.

[520]Lyden, Charles J., 1948. "'Me Gold Placers of Montana", Montana Bureau of Mines and Geology Memoir 26. Montana School of Mines, Butte.

example of the inherent difficulties of gold mining even, as was the case with the Spring Hill, when a large body of gold-bearing ore was known and accessible.

The discovery of gold placers in Last Chance Gulch during the summer of 1864 by the "Four Georgians" set off the gold rush into the area. Within a short time the best placer deposits were claimed, forcing latearriving miners to fan out to nearby Oro Fino, Dry and Grizzly gulches in hopes of finding another rich placer deposit. Nothing approaching the incredible bonanza of Last Chance Gulch was located, but the rich Whitlach-Union lode in Oro Fino Gulch was located in 1864, and two years later, the Spring Hill lode was discovered in the adjoining Grizzly Gulch.[521]

Ile Whitlach-Union and Spring Hill mines would turn out to be the only lode mines of any consequence in the Helena (also sometimes called the "Spring Hill") district. Initially the Whitlach Union mine, and its satellite community of Unionville, was the focus of most underground mining in the district. The mine produced over $6 million in gold and other metals until it was shut down in the early 1880s after the gold-bearing vein was lost and could not be re-located.[522]

Although the Spring Hill lode was discovered shortly after the Whitlach Union, and the Spring A' Hill mine was established by 1870 and was known to contain a large volume of gold ore (early exploration revealed a dike of gold ore more than a mile long), little was done to develop the mine. This was due to the fact that the ore was of fairly low grade and was difficult to refine.[523]

The property was patented in 1870 by six men who had formed the Memphis Mining Company. They filed patents for the Spring Hill Lode, Spring Hill Millsite claims, and a roadway connecting the two (Figures 38 -41). A few years later, Joseph H. Russell, one of the original six locators, acquired a majority interest on the lode claim while giving up two-thirds interest in the millsite claim to the holder of an adjacent claim. During the next two decades, other parties acquired the property but did little to develop the mine.[524]

The Spring Hill mine property ultimately would cover 400 acres and would comprise 24 patented claims. These would include the: Spring Hill, Success, Contact, Long Fred, Dolocath, Last Chance, Long Point, Oro Fino, Oroy Plata, Cleveland, and Circle lode claims and half interest in the Cliff and Mexicana lode claims, as well as the Lime Hill Placer claim. The company also held the unpatented lode claims of the Colorado, Jumbo, Milwaukee, Elsie, and Sunlight. The mine was located on the opposite side of

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[521]GCM Services, Inc., 1995. "Helena Mining District: Technical Version", prepared for the Department of State Lands by GCM Services, Butte.

[522]Pierce, A. L., 1931. "Mining Methods and Costs at the Spring Hill Mine, Montana Mines Corporation, Helena, Montana", U. S. Bureau of Mines, Information Circular 6402.

[523]GCM Services, Inc., 1995. "Helena Mining District: Technical Version", prepared for the Department of State Lands by GCM Services, Butte.

[524]Renewable Technologies, Inc. (RTI), 1994. Spring Hill Mine and Tailings, Lewis and Clark County, Montana. Report prepared for the Abandoned Mine Reclamation Bureau, Department of State Lands, Helena, Montana, by Renewable Technologies, Inc., Butte, Montana.

the divide about three-quarters of a mile from the Whitlach Union lode, on the east side of Grizzly Gulch and three miles above the junction of Grizzly and Oro Fino gulches.[525]

Although the property was not extensively developed during the late 1800s, some small-scale mining was done. Between 1885 and 1890,23,000 tons of ore was mined. Even though the ore averaged $5.34 per ton in gold, it was mined largely for pyrrhotite, which was more valuable as a flux for the smelter at Wickes. The mine was worked again around 1900 when a limited tonnage of low-grade ore was produced. The ore was treated at the Whitlach mill but the results were disappointing, so no further mining was done and the mine was abandoned.[526]

A mine with such a large deposit of known, albeit low-grade, gold-bearing ore was likely to remain idle for long. In 1904 the property was bought by Ralph Baggaley, director of the Pittsburgh and Montana Copper Company (also known as the "Pittsmont Company") which ran a mine and smelter in Butte. Baggaley also located or purchased several adjacent claims, including the Dolcoath, Last Chance, Circle, Success, Spring Hill Lime Placer, Long Point, Long Fred and other claims.[527]

In 1907 the property was bought by the Spring Hill Mining Company with James T. Stanford as president and Frank L. Sizer (who was also manager and supervisor at the Whitlach-Union mine) as secretary and general manager .[528]

Within a short time after its purchase, the Spring Hill mine was reopened and employed 65 men, with W.P. Parker as general superintendent. The first project involved driving an 875-foot tunnel during the winter of 1904 and 1905. A 250-foot raise was then driven from the tunnel to the surface in order to provide ventilation and an emergency exit. Other levels added another 1,000 feet of mine workings. Ile rock was of such hardness that little timbering was needed but when it was required, square sites and stulls were used. On the surface, a 70-ton capacity cyanide plant was built in 1907. A plant, located half a mile from the mine, housed an Ingersoll-Sargent 7-drill compressor, which delivered air by a pipeline to a receiver, relocated at the mine.[529]

The sulphide ore was found in large chambers which were developed extensively during the year after the mine was reopened. During the period from 1905 to 1907 the mine shipped from 700 to 800 tons of ore a month directly to the Pittsmont smelter in Butte for use as a fuel and flux. Some additional ore was also sent to the Anaconda Company's Washoe smelters in Anaconda. The mining journals during this period note

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[525]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver, Colorado.

[526]Ibid.

[527]Renewable Technologies, Inc. (RTI), 1994. Spring Hill Mine and Tailings, Lewis and Clark County, Montana. Report prepared for the Abandoned Mine Reclamation Bureau, Department of State Lands, Helena, Montana, by Renewable Technologies, Inc., Butte, Montana.

[528]Ibid.

[529]Walsh, William and William Orem, 1906. Biennial Report of Inspector of Mines for 1905-1906. Independent Publishing, Helena, Montana.

that in some cases as much as 60 tons of ore a day were being shipped and, in addition to the ore's value as a flux, it also contained up to $7 in gold per ton.[530]

The Spring Hill Mining Company leased the Whitlach 20-stamp miff in Unionville, and beginning in September of 1907 and continuing into 1908, 21,000 tons of ore were milled at the plant. The ore was trammed from the mine to the mill over a mile-long surface track. During the winter of 1907, a 70-ton capacity cyanide plant was built near the miff to treat tailings from the old stamp mill in addition to the ore from the mine. Mining engineer W. L. Creden reported that all ore taken from the mine was sent to the mill, no matter what its grade so, in effect, the mill operated "only as a testing plant".[531]

During this period the Spring Hill was the mainstay of the Helena district. In 1907 the district produced a total of 11, 179 tons of ore worth $56,283 and in 1908 the totals were 22,465 tons and $65,286. Virtually all of this production came from the Spring Hill mine.[532]

On July 8, 1907 the mine had a fatality when a miner named OH Oar was killed by a premature blast. Mining, by its nature, is a very hazardous occupation, although the spectacular large-scale mine disasters were comparatively rare during this period. More often, as was the case with Oar, it was an individual miner or small groups, who were injured or died in small rock falls, accidents with machinery, fires or (perhaps most common of all) premature blasts of explosives.[533]

The mine was also plagued by water problems. No sooner had the cyanide plant gone into operation than the company was hit with complaints from the secretary of the Montana Department of Public Health that the plant's cyanide was seeping into Helena's drinking water. The problem kept the mill from operating for much of 1908. Even though E. Starz of the Department of Public health said the mine's water system was safe, he was overruled by Thomas D. Tuttle, secretary of the Montana State Board of Health, who required the mine to raise the retaining wall of the mine's reservoir to prevent a possible overflow of waste water into the city's water supply. To add to the company's woes, in October there was a claim that a cow had died after drinking discharge water from the cyanide plant.[534]

Another more basic problem facing the mine was the fact that the cyanidation process was not very effective in dealing with the type of low-grade gold ore found in the Spring Hill mine. Even though mine officials claimed the process was very efficient (W. L. Creden reported the gold was extracted with "great rapidity" and with a "remarkable low consumption of cyanide..." and Frank Sizer said the plant recovered up to 85 per cent of the gold while a 19 10 report of the Spring Hill mine claimed the ore "is ideal for

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[530]Mining & Science Press (M&SP), 1904. Vol. 88, p. 445, Dec. 31.
[531]Creden, W.L., 1910. Report on the Spring Hill mine for James T. Stanford, President Spring Hill Mining Company, May 20.
[532]Eleventh Report of the Bureau of A Agriculture Labor and Industry 1908:203.
[533]Walsh, William and William Orem, 1909 - 191 . Independent Publishing Company, Helena, Montana.
[534]Walsh, William and William Orem, 1909 - 191 . Independent Publishing Company, Helena, Montana.

cyanidation") the ore, in fact, was extremely hard and was difficult to recover by amalgamation.[535]

The final blow came in October 1908, when the Whitlach Company refused to renew the Spring Hill Mining company's lease of its Unionville mill, resulting in a shut down of the mine. Although the mining journals indicated that some sporadic, limited work at the mine continued until 1915, the mine would remain idle for the next two decades. During this hiatus the owners would try to sell the property.[536]

Ile asking price for the mine, which consisted of the Spring Hill, Whitlach, and Twilight properties, was $ 1,000,000. Company reports, understandably, extolled the great potential of the mine which, in fact, still contained a large reserve of gold-bearing ore. W.L. Creden said "the situation of this gold property is an extremely favorable one both from a mining and milling standpoint' and he estimated the total net profit from known ore deposits could be around $850,000. Frank L. Sizer, company secretary, said development work had blocked out a deposit of 215,000 tons of ore with an average assay of $7.04 per ton and he estimated that just the "ore in sight" would yield a net value of $770,000.[537]

At this time, the principal stockholder of the Spring Hill Mining Company was W.C. Conrad, a Helena banker, stockman and capitalist. Conrad, however, was not a miner and, although it was lower than the original $1 million price tag on the mine, he appeared to have been asking a still unrealistically high price of $750,000 for the property. One prospective buyer, George W. Winter, noted that the purchase price of $750,000 plus possible development costs of up to $250,000 would exceed the estimated $850,000 net profits from the known ore reserves.[538]

An even more skeptical evaluation of the property by Augustus Cox for Frederick Bradshaw estimated the mine contained perhaps just a little over $808,690 worth of ore, but after adding the costs of development and equipment, he put the value of the property at only $175,520. He said local mining interest all "... attribute (the mine's) present condition to the policy of its owner, a Mr. Conrad, who knows absolutely nothing about mining". Even more harshly, Cox accused company secretary and manager, Frank L. Sizer of making "... an awful mess of the whole thing". He also darkly hints that Sizer "played Conrad crooked" but does not give any details. In spite of this, Cox still believed, for the right price, the mine could be a good investment.[539]

Efforts to sell the mine continued for the next few years, even though Conrad had died and the mine was under the control of his estate. In letters to J.E. Spurr, mining engineer C.H. Hand said the property was "extremely valuable" and estimated there was perhaps over a million dollars worth of known ore in the mine. William Muth said "there is no

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[535]Sizer, F.L., 1909. Letter to Jas T. Standford, President Spring Hill Mining Company, and report on the Spring Hill mine, May 3.
[536]Mining & Engineering World (M&EW), 1915. Vol. 42, p. 348, Feb.
[537]Sizer, F.L., 1909. Letter to Jas T. Standford, President Spring Hill Mining Company, and report on the Spring Hill mine, May 3.
[538]Winter, Geo. W., 1911. Letter to W.G. Swart, Denver, Colorado, on possible sale of the Spring Hill mine, April 16.
[539]Cox, Augustus, 1912. Letter to Frederick Bradshaw, Tonopah, Nevada, on the sale of the Spring HUI Mining Company, May 20.

doubt in my mind that the people who buy this mine will buy a real bonanza", while M. Vincent Wallace noted that the ore body as 49 a large mass" making the mine "an attractive and profitable proposition". In spite of these efforts, no buyers for the mine could be found and in 1916 the Spring Hill Mining Company defaulted on a $318,346 loan from the Conrad-Stanford Company. It immediately mortgaged the property from 1919 to 1934 the Spring Hill mine was held in trust.[540]

The mine finally acquired a new owner when the Montana-Idaho Mines Corporation obtained a lease and bond on the property in 1927. The company had been organized in Washington in 1914 for the purpose of developing a copper mine on the Montana-Idaho border near Adair, Idaho, but the venture failed when the main body of the copper vein could not be located. The company went through a number of reorganizations and then was incorporated in Montana in 1926. Using the last of its dwindling stock, the company acquired two mines near Winston: the East Pacific mine in 1926, and the Kleinschmidt-Irish Syndicate mine the following year. The two mines were immediately put into production and operated on a limited scale, however, the company's primary interest quickly shifted to the newly acquired Spring MR mine, which appeared to have the greatest potential.[541]

As soon as the company obtained the lease for the Spring Hill mine in 1927, it began mining and started construction of a new cyanide plant. A new adit was driven to connect with the lowest level of the mine's original workings. A total of 390 feet of drifts, 140 feet of crosscuts, 970 feet of raises and 490 feet of tunnels were developed in 1927 and the mine was able to ship 400 tons of ore before the year was out. The mill section of the plant was finished in November of that year. Early in 1928 the 200-ton cyanide plant was finished and was in operation. Later in the year, under the supervision of Charles Hewitt, the plant was expanded to 225-tons capacity and a second rnill unit was added.[542]

The new mine owners began to realize that the cyanide process was not very efficient, but nevertheless the mine became the lucrative operation they had been seeking for more than a decade. In its first full year of operation during 1928, the Spring Hill mine produced over 38,276 tons of ore, which yielded about $101,000 in gold and made the mine the third largest gold producer in Montana.[543]

After the cyanide plant started operating in February of 1928, it rapidly became evident that the process was not suited to the ore found in the Spring Hill mine. The ore was unique in a number of ways. Its only valuable mineral was in gold (with insignificant traces of silver and lead). The gold was found associated with arsenopyrite and pyrrhotite, which had to be ground very fine in the milling process and even then it was indistinguishable in the iron particles of the flotation concentrate. To make matters

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[540]Hand, C.H., 1915. Letter to J.E. Spurr on the possible sale of the Spring Hill mine, January 11, February 3.
[541]Carlson, Lars, 1929. "Montana Mines Corporation completing first step in expansion program, New crushing plant in Spring Hill to begin operation in Few Days." Montana Record Herald December 14, pp. 3-5.
[542]Ibid.
[543]Mineral Resources 1928 & 1931.

worse, the ore contained a high percentage of antimony and arsenic which fouled the cyanide solutions and resulted in a loss of much of the gold. In addition, the ore was extremely hard and tough which caused difficulties in mining and milling operations.[544]

Even the general geology of the mine was unusual. A large island intrusion of fine-grained diorite within the surrounding country rock (consisting primarily of carboniferous Madison limestone) was found at the mine. The contact of these two formations created the zone where the gold was found. The diorite is a basic segregation of the Boulder batholith quartz monzonite which is the dominate rock of the region. The huge pyrrhotite where the mine was first opened occurs next to the marbleized lime and between the pyrrhotite and diorite was found the main ore body.[545]

The company officials reached a decision early in 1929 to shut down the mill and switch to a flotation process. The cyanide plant was closed on March 10th and the next two months were spent converting the plant to a combined table and flotation plant. The new plant used two Dorr classifiers, two Minerals Separation Sub-A flotation machines and three Wilfley tables. On May lst the plant was back in operation. A short time later a second Minerals Separation machine was installed, the Wilfley tables were discarded and the plant was operated as a straight flotation mill.[546]

The ore crushing plant was also rebuilt in 1929 when it was found that the plant's 225 tons a day capacity could not keep up with the new flotation plant's 750 tons a day production. It was equipped with a 24 by 36-inch Traylor jaw crusher powered by a 75-horsepower slip-ring motor, a 14 by 18-inch jaw crusher also powered by a 75-horsepower motor; and a three-foot Symons fine cone crusher run by a 60-horsepower straight induction motor. The final grinding of the crushed ore was done in two seven-foot by 36-inch Hardinge conical ball Mills. One was powered by a slip-ring 125-horsepower motor and the other by a straight induction 150-horsepower motor. A short time later a third ball mill and another classifier were added to the plant.[547]

Ore was delivered from the mine in two-ton capacity ore cars to the ore bin where it was taken by the 24 by 36-inch crusher. After being broken into five-inch pieces at a rate of 20 tons per hour, the ore was carried by an 18-inch conveyor belt under a suspended magnet to remove drill bits and other pieces of scrap metal. The ore was then dumped into a self-cleaning grizzly where it fell into the 14 by 18-inch jaw crusher. The ore was taken from the crusher on an 18-inch cross conveyor belt up an 11 degree incline for a distance of 105 feet, where it was dumped on a four by five foot Leahy vibrating screen equipped with one-ton cap-screen cloth with nine-sixteenths by one-inch openings. The final crushing was done in the three-foot Symons fine cone crusher. The one-half inch

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[544] Carlson, Lars, 1929. "Montana Mines Corporation completing first step in expansion program, New crushing plant in Spring Hill to begin operation in Few Days." Montana Record Herald December 14, pp. 3-5.
[545] Ibid.
[546] Mineral Resources 1932.
[547] Grant, L.A., 1931. United States Bureau of Mines Information Circular 6411. Milling Methods and Costs at the Spring Hill Concentrator of the Montana Mines Corporation, Helena, Montana. United States Government Printing Office, Washington.

pieces were transported 780 feet on a 16-inch belt conveyor to the concentrator storage bin.[548]

At the grinding plant the crushed ore was fed from the 200-ton capacity ore bin to two seven-foot by 36-inch Hardinge conical ball mills by 16-inch belt conveyors. Each of the ball mills could process 4.2 tons of ore per hour. The finely ground ore was discharged into an elevator which, in turn, fed the ore into a distributing box feeding two overhead 4 x 14 Dorr classifiers. The sand products of the classifiers were returned to the ball mills while the overflow went directly to the flotation cells. During the grinding process, reagents (No. 5 pine oil, potassium ethyl xanthate, aerofloat reagent No. 25, and copper sulphate) were added.[549]

The flotation feed was then diluted in the flotation cells to approximately 19 per cent solids. Next, the flotation feed was fed into the two Minerals Separation machines for the final processing. The finished concentrates were then lifted by an elevator to a thickening tank. The overflow of the thickener was returned to the flotation cells while the underflow was fed into a four-foot, two-disk American filter where it was dewatered. Each of the Minerals Separation machines made a tailings product which was pumped to a 10 x 35 foot Dorr thickener where water was reclaimed and the underflow was taken in a launder to the tailings pond.[550]

The gold precipitates were refined in an oil-fired, tilted furnace that was housed in a separate building. A small amount of lead was also recovered from the final filter-tailing product in a small, four-cell flotation machine.[551]

It took a little over 100 gallons of water to process a ton of ore. Water for the operation was taken from a small creek near the plant and was pumped to a storage tank above the concentrator by a five by eight-inch Gould triplex pump. When there was not enough water in the creek (generally from August to April), about 20 per cent of the water used was reclaimed from the concentrator tailings.[552]

Other changes at the mine included: a new blacksmith shop, warehouse, timber shed and ore bin, a new road to the mill, and a long trestle and snowshed from the mine portal to the crushing plant.[553]

Also eventually included in the surface facilities were: a 1500 cubic foot capacity compressor plant, timber-framing shed, tram shed, cap magazine, carload-lot power

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[548]Ibid.
[549]Ibid.
[550]Ibid.
[551]Carlson, Jr., Gustaf, 1941. "Report on the Spring Hill Mine Near Helena, Lewis & Clark Co., Montana". Prepared for the Anaconda Copper Mining Company's Geological Department.
[552]Grant, L.A., 1931. United States Bureau of Mines Information Circular 6411. Milling Methods and Costs at the Spring Hill Concentrator of the Montana Mines Corporation, Helena, Montana. United States Government Printing Office, Washington.
[553]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver, Colorado.

magazine, miners' change house, garage, diamond drill shop, general warehouse, assay office and mine office.[554]

The mine's surface plant was run by 14 men which included four in the crushing plant, six in the concentrator, plus one mechanic, one electrician, one carpenter and one man on the tailings dam. The concentrator plant was able to recover from 80 to 87 per cent of the ore's gold at a cost of a little over one dollar per ton.[555]

The company's prospects improved in 1929 when extensive diamond drilling revealed new and richer ore deposits than had been previously mined. According to the January 1929 issue of the Mining Journal it was claimed that some of the assay samples ran high at $150 in gold per ton. The company also reorganized during the year with the Montana-Idaho Mines Corporation being succeeded by the Montana Mines Corporation. By the end of 1929 the new flotation plant had treated 33,272 tons of ore. This amount, combined with the 2,000 tons processed by the old cyanide plant before it closed, made the Spring Hill mine second only to the Anaconda Company in Montana's gold production.[556]

In 1930 the Spring Hill mine was the leading gold-producing mine in the state. Output from the mine increased nearly 50 percent over the previous year with a total of 70,751 tons of ore being treated. Ile resulting 4,394 tons of concentrates were sent to East Helena and Tacoma, Washington, for smelting.[557]

By 1930 the mine was developed and worked from main adit on the 300 foot level, which was the lowest of the old workings and the location of the original ore stope. The main adit served as the haulage level since all mining occurred above this level. Chutes gravity fed material into ore cars on the main level. Almost no hand tramming was done since most of the short haulage at the 300-foot level was done with horses. The two-ton capacity cars were the side-dump type and ran on 18-inch gauge tracks. The usual train consisted of six cars. The trains delivered the ore to the crushing plant ore bin located 500 feet outside the portal of the tunnel.[558]

Most of the mine workings were reached from the 200-foot level adit which, was the scene of the mine's early development. At the western end of the 200-foot level the ore body was mined to the surface forming a quarry (or "glory hole"). Ore was broken in this glory hole and then dropped through the chutes and passages to the 300-foot haulage level below. Near the center of the 200-foot level was the No. 1 shaft that rose

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[554]Carlson, Jr., Gustaf, 1941. "Report on the Spring Hill Mine Near Helena, Lewis & Clark Co., Montana". Prepared for the Anaconda Copper Mining Company's Geological Department.

[555]Grant, L.A., 1931. United States Bureau of Mines Information Circular 6411. Milling Methods and Costs at the Spring Hill Concentrator of the Montana Mines Corporation, Helena, Montana. United States Government Printing Office, Washington.

[556]Renewable Technologies, Inc. (RTI), 1994. Spring Hill Mine and Tailings, Lewis and Clark County, Montana. Report prepared for the Abandoned Mine Reclamation Bureau, Department of State Lands, Helena, Montana, by Renewable Technologies, Inc., Butte, Montana.

[557]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver, Colorado.

[558]Pierce, A. L., 1931. "Mining Methods and Costs at the Spring Hill Mine, Montana Mines Corporation, Helena, Montana", U. S. Bureau of Mines, Information Circular 6402.

200 feet and cut through the old pyrrhotite stope. It was used for transporting drill steel and other supplies. Shafts No. 2 and No. 3 connected the 300 and 200-foot levels at the eastern and western ends. About a dozen crosscuts extended out from the 200-foot level.[559]

The ore body was mined continuously for over 600 feet horizontally and in place, vertically, for up to 350 feet. The maximum width was about 100 feet, although the average was more like 20 feet. The hard ore was mined by a combination of sub-level, open stopes and caving systems. Drilling was done with heavy Leyner-type machine and self-rotating wet stoper drills. Power for the drills was supplied by a 750-cubic feet per minute angle-compound air compressor. Usually about 50 pounds of 40 percent strength gelatin dynamite were used to blast a five to six foot section. Jackhammers were then used to slab and break oversize pieces. The drift crew was made up of four miners. Two men would drill and fire the round on the night shift and the other two would shovel the ore on the day shift.[560]

Due to the exceptionally hard nature of the ore, little timbering was needed, except on the haulage level and to build grizzly chambers (a bin-like chamber with 90-pound rails at the bottom used to separate and then breakup oversize pieces of ore) above the chutes. This absence of timbering, plus the low sulphur content of the ore, resulted in the mine having a very low hazard of underground fires. The mine also did not require a large pump installation, since only 24 to 50 gallons of water per minute flowed into the workings. Nor were any powered fans required for ventilation since the air currents were strong enough to provide natural ventilation. During the winter months doors were needed to reduce the draft.[561]

The underground crew usually consisted of about 40 men who were supervised by day and night foremen, a mine superintendent and a general manger. The men worked an eight hour day and (in 1930) were paid $5 a day for muckers, trammers and grizzly men, and $5.50 a day for miners and car loaders. Later, miners were paid on a bonus system with development work paid for at a rate of $6 per foot for untimbered drifts, raises and crosscuts; and $7 a foot for timbered raises.[562]

It appeared that 1931 would be an even better year for the mine, but in the precarious and unpredictable mining business nothing is ever certain. The year started out well for the company. The new flotation plant and grinding mill were working well, the new ore deposits were yielding good ore, and development work was continuing in the mine. For the first half of the year the mine operated at a normal rate and produced 54,526 tons of gold bearing ore by the end of August, which was ahead of the production rate for the previous year. But just when the company's immediate future prosperity seemed assured, disaster struck when the miffing plant burned down resulting in a shut down

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[559]Ibid.
[560]Ibid.
[561]Ibid.
[562]Ibid.

of the entire operation on August 3 1. The mine would stay closed for the next two years.[563]

In May of 1932, the company reorganized as the Montana Consolidated Mines Corporation. The gold mining industry was given a boost when the official price of gold was raised to $35 an ounce. This motivated the company's major stockholders to raise funds to get the mine back into production. Construction of a new mill was begun on the site of the original plant early in 1934. The 250-ton (later increased to 300-ton) capacity flotation plant was a new, more efficient design and went into operation in September of 1934.[564]

Shortly after the mine went back into production, the mine was shut down again in December of 1934 by a strike of the mine's 70 employees. The strike lasted for three months but was settled in March 1935 and the mine resumed production on March 16th. The mine demonstrated it was still a valuable property during the brief period it operated in 1934, producing concentrates which were shipped to the East Helena smelter and yielded over 1,000 ounces of gold which netted returns of $31,202.59.[565]

Following the strike settlement, the mine operated continuously for the rest of 1935 and during all of 1936. In 1935 some 76,800 tons of ore were treated in the flotation plant, and in 1936 more than 93,200 tons were processed, which yielded 8,430 ounces of gold. In 1937 the mine once again operated for the entire year, producing 89,652 tons of gold ore, which was processed down to 5,200 tons of concentrates.[566]

Towards the end of 1938, the company constructed a small 25-ton cyanidation plant to treat flotation concentrates from the mill. The plant went into operation early the next year and the mine continued to produce, but then a labor strike at the American Smelting & Refining Company's East Helena smelter shut down the smelter forcing the Spring Hill mine to suspend its operations on June 29, 1938. During the half year it was in operation, the mine produced 52,414 tons of ore. The Spring Hill operation was able to resume the following year in March 1939 and continued until the spring of 1940. During this period it produced almost 59,000 tons of ore.[567]

This would turn out to be the last significant production from the Spring Hill property, although there would be some sporadic small-scale processing of mine tailings. In addition to the closure of the East Helena smelter, the mine had been facing decreasing ore reserves and declining ore grades, which, at best, had always been low-grade. Shortly after the entire mine operation was shut down in April 1940, the Montana

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[563]Brazier, C. R., editor Review of Greater Helena Region., 1935. Spring Hill Great Gold Producer, Mining Review Montana Historical Society Library, Pamphlet #1225-CA.

[564]Ibid.

[565]Abandoned Mine Reclamation Bureau (AMRB), 1994. Mining districts of Montana. Maps 1:100,000 and Map #94-NRIS-129. Compiled and edited by Joel Chavez. Prepared by Montana State Library Natural Resource Information System (NRIS) for Montana Department of State Lands. Helena.

[566]Mining Journal (MJ), 1936 Vol. 19, pp. 23-24, May 15; Vol. 20, p. 26, Aug. 30.

[567]Renewable Technologies, Inc. (RTI), 1994. Spring Hill Mine and Tailings, Lewis and Clark County, Montana. Report prepared for the Abandoned Mine Reclamation Bureau, Department of State Lands, Helena, Montana, by Renewable Technologies, Inc., Butte, Montana.

Consolidated Mines Corporation went into receivership after it defaulted on a $61,100 loan from the Minmont Company. The Minmont Company bought the mine during a foreclosure sale on August 2 and 3, 1940 and then acquired clear tide to the property a year later.[568]

There may have been some small-scale re-working of tailings on the site in 1948 and the Minmont Company kept the door open to possible renewed mining activity on the property. However, apparently no serious efforts were made to reopen the mine. Attempts were made to interest the Anaconda Copper Mining Company in 1941 and the Panimas Company in 1944 to purchase the property, but nothing came of either prospect. During World War II in 1943, negotiations were conducted with the Volcan Company to sell the Spring Hill's mill equipment to their zinc mine in Peru. Apparently the government put a stop to the deal since it involved mining interest in Argentina which, at that time, was considered to be an Axis sympathizer. The next year a party in Basin, Montana, was interested in buying the equipment but nothing came of this possible sale either. By 1972 the Minmont Company was defunct.[569]

Total production during the latter period of the mine's operation from 1928 to 1941 amounted to 66,168 ounces of gold. Over its entire lifetime, the mine is estimated to have produced 75,000 ounces of gold, worth well over $2 million.[570]

Yet, in spite of this impressive production record, the Spring Hill mine, over its lifetime, was a losing proposition. Gustaf Carlson, Jr., a former official with the Montana Consolidated Mines Corporation, calculated that over the mine's last 12 years of operation the profits from the marketed gold failed by $31 per ton to meet the direct costs such as the mining, milling, taxes, interest and administrative costs.[571]

Carlson attributed this failure at the Spring Hill mine to poor management and mining practices. With the difficult and low-grade ore deposit the mine worked, it was vital that development was done well in advance of mining so as to obtain the best ore in the most efficient way possible. But Carlson states that the mine was never more than just two or three months ahead of the milling operation. This practice resulted in a situation where production had to come from a block of ground that had just been developed, regardless of whether or not the ore was satisfactory. Often waste rock was mixed with good ore, which greatly decreased the efficiency of the remaining operations such as haulage and milling.[572]

Carlson also notes that the mill and flotation plant were seldom operated at their full capacity and when they were "it was more of a coincidence than the result of adequate

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[568]Dingman, Oscar A., 1943. "Appraisal of the Milling and Mining Machinery Equipment and Buildings, Spring Hill Mine, Helena, Lewis and Clark County, Montana". Report prepared for the Minmont Corporation, Helena, Montana.

[569]Beltran, P.G., 1943. Letter to Oscar A. Dingman, Montana School of Mines, Butte, Montana, on possible sale of the Spring Hill mine's mill to the Volcan mine in Peru, May 20.

[570]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State. Sage Books, Denver, Colorado.

[571]Carlson, Jr., Gustaf, 1941. "Report on the Spring Hill Mine Near Helena, Lewis & Clark Co., Montana". Prepared for the Anaconda Copper Mining Company's Geological Department.

[572]Ibid.

development', and even when it was operated at capacity the mill recoveries were never very good. According to Carlson, most of the lost time in the mill was due to lack of ore rather than any mechanical problem. However, he concludes that given sufficient working capital with a more efficient operation at capacity over a shorter period of time, the mine could have been a profitable one. The Spring Hill mine is a good example of the inherently capricious and volatile nature of Hardrock mining where, even when a large known body of gold-bearing ore is mined, the line between success and failure is a very narrow one.[573]

Rimini Mines Historic Context
By: GCM

The historic Rimini mining district has been known by many different names including the: Lewis and Clark district, Tenmile district, Vaughn district, Colorado district, and the Bear Gulch district. Eventually, it came to be called the "Rimini District" after the area's mining center of Rimini.

How the town got it name is a source of conjecture since there are a number of different versions of how "Rimini" was selected. Muriel Wolle and Ted Hulbert say the town was originally known as "Young Ireland" but it was renamed Rimini after the citizens saw (and apparently were greatly impressed by) the play "Francescada Rimini" performed by a traveling road company. Harriett Meloy, however, says the name was given to the little mining community in 1884 by former Montana governor and then assistant postmaster general, J. Schuyler Crosby, who arbitrarily assigned the name at the urging of an actor friend who was in the play. But, according to A. L. Clark Crosby suggested the name while he was still governor. This story claims that a delegation of Rimini citizens approached the governor while he was at a performance of the play in Helena with the name of "Lee Mountain" but the governor said the Post Office would probably not accept a two word name so he suggested "Rimini" instead. A delegation of Irish citizens agreed thinking that since the author of the play, Lawrence Barrett, was Irish then Rimini must be a town in Ireland. Whatever the circumstances, either directly or indirectly (and in spite of what the Irish inhabitants believed), Rimini got its name from the city in Italy with the same name.[574]

The district was one of Montana's first hardrock mining districts to be recognized, as is evidenced by the fact that some of Montana's earliest claims were located there. Mineral Survey numbers 3, 4, and 5 were located on Red Mountain and survey 13 was located on Lee Mountain. By 1890 the town of Rimini had a population of 282 (in 1890) with falsefront frame buildings, log cabins, tents, shacks and mines strung out for a mile on both sides of the single road which ran through the narrow gulch.[575]

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[573]Mahan, John W., 1944. Letter to Oscar Dingman, School of Mines, Butte, Montana, on the Spring Hill mine.
[574]Hulbert, Ted, 1962. "Naming of Rimini Was Fight Between Irish Italians; Yule Mail to Mayor' Reveals", Helena Independent Record. December 30, p. 3.
[575]Helena Independent Record 1962.

Lode mining got underway in the mid- 1860s with the discovery of the Lee Mountain lode in 1864 and the Eureka mine in 1865. The most important mining company during the 1880s was the Red Mountain Consolidated Mining Company that was incorporated in 1886 and was instrumental in developing the Lee Mountain and Lexington mines. A number of other mines were developed with the most productive ones being the East Pacific, Lady Washington, John McGraw, Eureka and Porphyry Dike. Some of the mines were opened to depths of up to 500 or 600 feet but little major production occurred. One of the most active mines during this period was the Lexington that produced 2,912 tons of ore in 1888 and 1889. The ore was treated by the Great Falls smelter and yielded $58,912 (or about $20 per ton) after shipping costs which amounted to nearly one half of the ore's value. The Lexington was typical of most of the major Rimini mines in that it produced a limited quantity of high-grade ore for a brief period and then either shut down or was operated on a small-scale, intermittent basis from that point on.[576]

Placer mining was also active during this period. Above the town of Rimini, placers were worked during the 1870s and 1880s and then again from 1900 to 1903. The placer deposits in the Upper Tenmile contained large masses of rich tin ore while the numerous gulches that feed into the Upper Tenmile each contain several lode mines. Blue Cloud Gulch contains the War Eagle, Golden Eagle, Sucker, Lincoln, and Blue Cloud. A 10-stamp mill was erected to work the ores from the Blue Cloud Gulch's mines. Nelson Gulch was famous for its rich placers and several quartz mines including the, Shober, Manassa, Sagamore, Robedeaux, and Yellow Boy.[577]

The Rimini placers were not major placer deposits but the district was reported to have produced about $80,000 during the period from 1864 to 1920, with most of this production coming during the 1870s and 1880s. Some additional placer gold was taken in 1912 when 289 ounces (worth $5,972) were recovered and again in 1941 and 1942 when 265 ounces of gold were recovered by dry-land dredges on Tenmile Creek at the Gould deposits.[578]

Across the Tenmile from Nelson Gulch was the Old Battle Ground mine and above this mine, nestled in the foothills, are the Humbolt, Crossett, Old Dominion, Morning Star, Carrie, and Flora. Colorado Gulch has the King David, Hopewell, Ingersoll Baby, Trustful, and other mines while Red Mountain also had a large number of mines which saw major development. These would include the: Legal Tender, Garfield, Gregory, Silver Reef, Saratoga, Emma, Granite Mountain, Iron Cap, Iron Dollar, Ontario, Snow Drift, Arcade, chutzpah, three unnamed tunnels and other mining prospects. Mines were located east of Rimini above Red Mountain and a large number were found below Rimini such as the: Capitol, Yellow Boy, Orphan Boy, Bonanza, Little Bonanza, Sterling,

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[576]Anaconda Copper Mining Company (ACMC), ca. 1945. Peerless Jennie Mines - Description. Anaconda Geological Document Collection, American Heritage Center - University of Wyoming, Laramie, Wyoming.
[577]Schrader, Frank Charles, 1929. "Central Montana Summarized", Mining Truth, Vol. 14, No. 15, pp. 7-9.
[578]Lyden, Charles J., 1948. Montana Bureau of Mines and Geology Memoir No. 26. The Gold Placers of Montana. Montana School of Mines, Butte, Montana.

Price, Mac, Enterprise, Knickerbocker, Tin Horn, Morning Star, April Fool, Stonewall Jackson, and Washington.[579]

One of the persistent problems impeding large-scale development of the mines was the chronic lack of sufficient water for mining operations. Most of the ores found in the Rimini district needed to be concentrated before shipment and this required a constant supply of large volumes of water. Many of the creeks in the district did not have the amount of water needed (except during spring run-off) and to further complicate the problem, the city of Helena depended on the Rimini watershed for its drinking water. During this period Helena spent $450,000 to acquire all the water of Tenmile Creek. This, and the fact that Helena blocked any construction of mills in the watershed that would pollute the water, effectively blocked any substantial development of the distdcfs mines.[580]

The stagnate mining situation might have changed dramatically if a scheme to build a branch railroad line to the district had succeeded. James J. Hill, president of the Great Northern Railroad, envisioned consolidating and developing the mines while building a line from his railroad to the mines of Rimini which would have made it possible to ship ores directly to the Helena & Livingston Smelting & Reduction Company smelter in East Helena. In 1886, Hill founded the Red Mountain Consolidated Mining Company and, with European capital, bought out the claims of Joseph H. Russell (who had discovered and patented the property in 1883) for $110,000. However, Hill was advised to drop the project and end his feud with the Northern Pacific. He did end the project which then ironically opened the way for his rival, the Northern Pacific, to build the rail line, which was named the "Helena & Red Mountain Railroad", to Rimini in 1886.[581]

The completion of the railroad by the Northern Pacific opened the district to major mining production during the period from 1885 to 1900. A letter from the Federal Assayer in Helena to S. T. Hauser, president of the Helena, Boulder Valley & Butte Railroad in 1888, reported that the Rimini district currently produced only $5,000 but possessed "vast quantities of low grade ore, which by reason of the railway will be rapidly developed". Soon after, one of the deepest mines, the Lee Mountain, produced more than $1.5 million and the Valley Forge produced more than $200,000 worth of minerals. The district shipped 400 tons of ore per week in 1891 with most of the ore being sent to the smelter at Wickes.[582]

This flurry of mining development came to an abrupt end in 1893 with the repeal of the Sherman Silver Purchase Act, which ended the governmental support of silver, prices. By 1898 only the Porphyry Dike mine was worked with any success.[583]

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[579]Schrader, Frank Charles, 1929. "Central Montana Summarized", Mining Truth, Vol. 14, No. 15, pp. 7-9.
[580]Montana Daily Record, 1916. "Red Mountain and Rimini Districts", April 22.
[581]Dillon Examiner, 1920. "Louis Hill to Mine at Rimini?" (in Montana News Association insert), February 16, p. 157.
[582]Montana Historical Society, 1976. Not in Precious Metals Alone. The Montana Historical Society, Helena, Montana.
[583]Calderhead, J. H., 1898. "Montana Bureau of Agriculture, Labor, and Industry, 6th Annual Report."

The town of Rimini continued to survive with a population of about 100 even though most of the district's mines were shut down or were operating on a limited basis, at best. The Helena Independent Record on June 14, 1907, reported that the Valley Forge mine had closed down for the day so the miners could attend the celebration of Miners' Union day. Although, at this point, the Valley Forge was probably the only active major mine in the district, the paper reported that the event drew the largest gathering of people in the history of Rimini.[584]

James J. Hill's dream to consolidate the Red Mountain mines with a single tunnel remained alive even though Hill had died in 1916. The reality of carrying out the project, however, proved to be far more difficult than he or his successors imagined. His plans for a smelter near Rimini were blocked by the city of Helena because the smelter site was too close to Chessman Reservoir which was Helena's principle water supply. Consolidation and development of the mines was complicated by numerous difficulties. Water remained a seemingly insurmountable problem. There was either too much during the annual spring flooding on Tenmile Creek and its tributaries or there was too little to operate concentrators during the rest of the year. A chronic lack of funds to keep the mines open; depressed metals prices; and endless legal difficulties (including the scattering of much of the company's stock in England which made it impossible for the company to operate) further hampered efforts to revive the mines. Indicative of the frustration in Rimini over the situation can been seen in an article in the Helena Daily Independent in 1924 which railed against an unnamed and unspecified "attitude of state administration." They were charged with discouraging a deal with "...one of the biggest chemical and paint manufacturing concerns in the United States" to develop arsenic deposits at Lee Mountain and construct a large reduction works.[585]

In spite of these seemingly insurmountable hurdles, the project finally got underway during the late 1920s when the Montana Lead Company was organized by Hill's estate in 1927. The new company consolidated the Lee Mountain holdings with those of the Red Mountain Mining Company and then began construction of the Red Mountain Tunnel begun on the east bank of Tenmile Creek, half a mile south of Rimini, at an altitude of 5,400 feet. In order to work the claims more efficiently using gravity to drain the mines and to move the ore and waste rock, a tunnel along the lines of the Sutro Tunnel of Virginia City, Nevada.

The original Sutro Tunnel was dug in an effort to revive the fading bonanza mines of Virginia City, Nevada. These mines had become too expensive to pump and too deep to profitably haul out waste rock and ore. In an expensive gamble, a long tunnel was carved from the valley floor to a point under the mines. Completed too late to save the mines, the tunnel did successfully demonstrate the use of gravity in removal of water and rock from the mines. While not a fiscal success, the tunnel was widely copied throughout the hardrock mines of the Rockies and abroad.

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[584]Meloy, Harriett, 1995. "Rimini", Helena independent Record, August 24, pp. 1A & 6A.
[585]Ibid.

In 1936 the Red Mountain tunnel had reached a length of over 3,500 feet along the Red Mountain fault, cutting 40 or more quartz veins, including the Free Speech, Alta, and Eureka veins. The tunnel eventually connected underground with the Free Speech, Alta, and Eureka mines and a small amount of ore was mined, most of which came from the Free Speech vein. However, the project did not develop sufficient ore of marketable grade to justify continuation of the operation.[586]

By this time the Rimini district's major period of production was over. The Depression hung like a pall over the mining industry, most of the profitable ore veins had been mined out. Under these circumstances, when the Red Mountain Tunnel project was unable to live up to its promise and revive the district's fortunes, any plans to resurrect the Helena and Red Mountain Railroad were abandoned.

Although the Rimini could hardly be classed as one of the Montana's major bonanza districts, it had a respectable production run and had reportedly produced an estimated $7 million in minerals. Most of this production occurred prior to 1900 (for which there are no records available). By contrast, despite great effort only $1,980,000 was produced between 1902 and 1958; most of this came in the form of base metals mined at the Peerless Jenny during World War I.[587]

Because the Rimini did not experience any classic "boom!' periods. The coming of the railroad in 1886 certainly increased ore shipments out of the district. This period of activity was curtailed by the crashing in the Montana mining industry brought on by the repeal of the Sherman Silver Purchase Act in 1893. Subsequent periods of activity tended to confine themselves to one or two years in one or two mines.

Rimini Mining District
By: Lon Johnson & Fred Quivik

The Porphyry Dike mining area lies approximately five miles southeast of Rimini and ten miles north of Basin, straddling the divide between Lewis and Clark and Jefferson Counties. The Rimini Mining District to the north was the scene of some of the earliest mining activity in the state. It was not until the 1880s that placer mining at the head of Ten-Mile Creek confirmed the source of gold as the unusual rhyolite porphyry deposit near the Continental Divide.[588] The Engineering and Mining Journal of October 2, 1897 provides a detailed explanation of the geology of the area and its surroundings:

The geology of this tract is simple in its general features, but complicated in detail. The upturned metamorphosed and sedimentary rocks only seen in the neighboring ranges surround a great mass of intrusive granite varying in nature, but essentially a geological

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[586]Becraft, G. E., Darrell M. Pinckney and Sam Rosenblum, 1963. United States Geological Survey Professional Paper 428 . Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana. U.S. Government Printing Office, Washington, D.C.

[587]McClernan, Henry G., 1983. "Metallic Mineral Deposits of Lewis and Clark County, Montana", Montana Bureau of Mines and Geology Memoir 52. Montana College of Mineral Science and Technology, Butte.

[588]L.A. Sisley, "The Porphyry Dike Mines of Montana," The Engineering and , 64 (October 2, 1897) :399.

unit. Dark andesite rocks resting upon an uneven surface of granite cover a considerable part of the great tract. Both granite and andesite are covered about the borders of the tract by rhyolitic rocks of varying nature. Erosion has removed large areas of both rocks, the granite now forming the surface. In the immediate neighborhood of the Porphyry Dike mines the dark andesitic rocks are not present, but rhyolites rest directly upon the uneven surface of the granite. The eruptions of rhyolite are seen to have been only local in character, and but a relatively small tract is covered by them. The Porphyry Dike ores ... are gold ores, all free milling, and occur only in the rhyolite porphyry. This mode of occurrence is, so far as we know, unknown elsewhere in Montana.[589]

The gold existed in narrow fissures and minute cracks throughout the porphyry. Therefore, it appeared that a successful operation would require milling of all of the low-grade ore.[590] Since the ore lay exposed on the surface, it could be mined from open pits or "glory holes," 'thus eliminating the costs of tunneling, timbering, and ventilating usually associated with hard rock mining. Mining operations at the Porphyry Dike, however, were continually plagued by the necessity of finding methods to keep tailings from flowing into the tributaries of Ten-Mile Creek and contaminating the City of Helena's domestic water supply.

The Pauper's Dream Mining and Milling Company was organized in 1895[591] by Theobauld Schweitzer. He had purchased a group of claims on the deposit.
The following year, the Pauper's Dream began quarrying the rock at the Mollie Stark claim in terraces, and processing it at a 10-stanp mill. The Columbia mill, owned by Moses Manuel,[592] and the Merrill Mining Company mill, presumably on the Venus claim,[593] were also processing ore.[594] Projections, that 500 men would be working on the Dike that spring proved overly optimistic.[595] The Pauper's Dream and Merrill mills were shut down by August and the Columbia mill was working only sporadically. Despite a delivery cost to the mills of only 10 cents a ton, the necessity of breaking down all of the ore to recover the gold did not prove profitable.[596]

The announcement of the closing carried a glimmer of hope in an experiment undertaken by Patrick Largey of Butte, the principle stockholder in the Pauper's Dream. Before the mill closed, Largey had successfully crushed rock in a cylinder with balls (a ball mill) and was having two cylinders manufactured for installation in the mill.[597]

Work at the Pauper's Dream resumed in the fall of 1896 with the construction of a tunnel to reach the bottom of the shaft. The rock was broken off at the top of the shaft

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[589]Ibid.
[590]The Engineering and Mining Journal 62 (August 8, 1896) :134.
[591]Edwin A. Mohler, "Cultural Features Found at the Paupers Dream mine project Site, Lewis & Clark and Jefferson Counties, Montana," cultural resource report prepared by Econ, Inc., Helena, MT, 18 June 1987.
[592]The Engineering and Mining Journal 61 (February 8, 1896) :142.
[593]Mohler, p. 2.
[594]The Engineering and Mining Journal, 62 (August 8, 1896) : 134.
[595]Engineering and Mining Jam-al. 61 (March 7, 1896) : 237.
[596]Engineering and Mining Journal 62 (August 8, 1896) :134.
[597]Ibid.

and dropped into cars in the tunnel for delivery to the mill. Entrance to the 500-foot tunnel was in Coon Hollow, between the mine and the mill.[598] By 1898, the mines were inactive again. In a 1908 letter, Schweitzer stated that the mines were closed by an injunction issued by Judge Knowles at the request of the Helena Water Co.[599] The total ore treated during this period was 10,200 tons at the Pauper's Dream mill, about 8,000 tons at the Venus mill, and13 21,222 tons at the Columbia mill.[600]

It became apparent that it was going to take a large amount of capital to profitably mine the low-grade ore on the Dike. A "syndicate" headed by Charley McClure of St. Louis[601] began consolidating the claims on the Dike and undertaking exploration work.[602] This group, referred to as Heinze, Breen & Mclure in 1906, was employing 60 men to determine the depth and values of the ore bodies on the Dike. A 1600-foot tunnel was also constructed across the Dike.[603] This exploration work apparently did not result in much if any development, for a 1913 USGS bulletin refers to all mining activity on the Dike in the past tense and describes only those features at the Columbia which existed in 1906.[604]

Deeds to the claim on the Porphyry Dike show that by 1902, a majority of the claims were in the hands of Louis McClure, presumably a relative of Charles (both men were from St. Louis), James Breen, and the Pauper's Dream Milling and Mining Company.[605] Unfortunately, it is impossible to determine how these companies were inter-linked, although the journalistic coverage and the mix in ownership of some of the claim indicates they were. Over the next two decades, James Breen became the major operator on the Dike, the majority stock holder in the Porphyry Dike Gold Mining Co., and owner of the Pauper's Dream claims.[606] In 1929, Elizabeth Breen, James' widow, controlled about one-half of the 1.5 million shares of the company.[607]

James Breen was a metallurgist and associate of F. Augustus Heinze. He managed Heinze's Montana Ore Purchasing Co. and the two men jointly awned the Broadwater Hotel in Helena. Breen also awned smelters at Rossland, British Columbia and Newport, Washington, and the Spokane Hotel in Spokane and the Tacoma Hotel in Tacoma. In 1907, Breen purchased two and one-half miles of Missouri River frontage between the Crooked Falls and the Great Falls in Great Falls, Montana. The local newspaper speculated that Heinze would soon be establishing a smelter on the

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[598]Engineering and Mining Journal 62 (October 17, 1896) :373.

[599]Theobauld Schweitzer to James Breen, 23 August 1908, copy of letter at offices of Econ, Inc., Helena, Montana.

[600]Theobauld Schweitzer to James Breen, 23 August 1908, Porphyry Dike papers, Econ, Inc., Helena, Montana; U.S. Department of the Interior, U.S. Geological Survey, Geology of the Basin Quadrangle Jefferson, Lewis & Clark, and Powell Counties, Montana, by Edward T. Ruppel (Washington D.C.: Government Printing Office, 1963), p.115.

[601]Ibid., p. 43.

[602]Twelfth Annual Report of the Inspector of Mines of the State of Montana: December 1. 190, (Helena: Independent Publishing Co., 1901), p. 32. Also see the chain of title for these claims at the Basin Creek Mine Office.

[603]Engineering and Mining Journal 25 (August 11, 1906) :166; 25 (October 27, 1906) : 803; Biennial Report of the Inspector of Mines of the State of Montana for the Years 1905-6, (Helena: Independent Publishing Co., 1906), pp. 103-104.

[604]Adolph Knopf, Ore Deposits of the Helena Mining Region, Montana [united State Geological Survey, Bulletin 527] (Washington: Government Printing Office, 1913), pp. 84-85.

[605]See the chain of title for these claims at the Basin Creek Mine Office, Helena, Montana.

[606]"James Breen Dead, Played Big part in Developing Section, is Helena," 12 August 1925, p. 1.

[607]See the minutes of the April 23, 1929 meeting of the stockholders of the Porphyry Dike Gold Mining Co., Secretary of states office, State Capitol, Helena, Montana.

property. For 25 years while engaged in his other activities, Breen clung to the belief that the Porphyry Dike would become one of the largest gold mines in the world.[608]

In 1914, Breen's Porphyry Dike Gold Mining Co. let a contract to Taylor Engineering and Manufacturing Co. for the construction of an electrically powered 20-stamp mill. The development of the mill included "homes for superintendents and miners."[609] The Columbia amalgamation mill (awned and operated by the Porphyry Dike Gold Mining Co.) was the largest producer in the Rimini area that year, mining its ore from surface workings with steam shovels.[610] The Porphyry Dike Gold Mining Co. Is mill continued to lead production in 1915.[611]

Late that year, however, the Helena City Council notified James Breen that "he must not permit water from his stamp mills, carrying sand and powdered rock, to flow down the side of the mountain where it might reach the upper waters of Ten Mile Creek.[612] The Helena Independent immediately began a crusade to sway public opinion against the decision of the city Council. Beginning with a front-page article on September 5, 1915 entitled "City Blocks operations of Porphyry Dyke [sic] Mine by Short-Sighted Policy," the Independent followed with almost daily articles for a week.

In the September 5 edition, the independent chided the City of Helena for "standing squarely in its own road to prosperity." Combined with the production of the Porphyry Dike mines, it was predicted that the Rimini area could support three concentrators, a payroll of a million dollars a year, and increase the population of the City of Helena from 25 to 50 percent. James Breen was quoted saying: 'Mm little (20-stanp) mill is making money---and it will grow. We will make it 100 stamps---600 stamps, even a thousand stamps, and when we are handling 5,000 tons of this rock a day, the supply is so vast that it will be scarcely touched during my lifetime."

James Breen made it clear that he did not want to expropriate the Ten-Mile Creek waters. He only wanted to be able, to allow the waters used in his stamp mill and any other Stamp mills and concentrators that would be built "to flow into Ten Mile Creek and be carried away." He also wanted to permit the tailings from his mill to flow into the creek and be carried away. In response to opposition from irrigators in the Helena valley who questioned the effect of cyanide used in the milling process on their lands and crops, the Independent quoted "assayists" who stated that there was absolutely nothing to worry about.[613]

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[608]"Death of James Breen," Butte Miner, 12 August 1925, p. 1. "Mr. James Breen," Butte Miner, 12 August 1925, p. 4. "James Breen Dead, Played Big part in Developing Section," Helena Independent, 12 August 1925, p. 1. "For Another Smelter," Great Falls Evening Leader, 3 March 1907, p. 1.

[609]"City Blocks Operations of Porphyry Dyke (sic] Mine by Short-Sighted Policy," Helena Independent, 5 September 1915, p. 1.

[610]Engineering and Mining Journal (July 4, 1914) :39; Mining and Engineering World 41 (October 24, 1914) :780; Mining and Scientific Press 109 (December 5, 1914), p. 894; U.S. Department of the Interior, United States Geological Survey, Mineral Resources of the United States, 1914 - Part I, p. 784.

[611]Mineral Resources of the United States. 1915, p. 599. The Porphyry Dike Gold Mining Co. purchased the Columbia in 1913.

[612]Helena Independent, 5 September 1915, p. 1.

[613]Helena Independent, 5 September 1915, p. 3.

A solution to the water problem was available to the City if it would acquire its water from side streams flowing into Ten Mile Creek and transport it by pipeline, turning Ten Mile Creek itself over to the miners. The City Council apparently felt the mining interests should build the pipeline; the miners felt it was the responsibility of the City.[614] The articles promoting turning Ten Mile Creek over to the mining interests detailed in vivid descriptions the polluted condition of the City's water supply that ran through an open ditch to the intake. By September 10, the Independent changed its tactics to gain wider public support for abandoning Ten-Mile Creek. The public health benefits of piping the City's water supply supplanted the economic benefits to the community as the focus of a front-page article. A Dr. Riddell stated that "[i]t makes no difference whether tailings from the mines in the Rimini District are dumped into Ten Mile creek or not, it is not proper water to use."[615]

A few days later, however, the Helena City Council authorized the mayor to bring suit against any mines that were polluting the city's water supply in the Ten Mile drainage.[616] On September 16, the City of Helena sought a permanent injunction against the Porphyry Dike Mining Co. until the tailings from the mill were removed from the Ten-Mile and Monitor gulch watersheds.[617] James Breen ceased operations at the Porphyry Dike mill, lying off 30 of the 42 employees.[618]

At about the same time, Breen bonded the Porphyry Dike mines to the Anaconda Copper Mining Co. The ACM undertook its own exploration of the site to determine the extent and value of the ores.[619] The ACM owned approximately 20 percent of the Porphyry Dike Gold Mining Co.'s stock by 1929.[620]

James Breen replaced the 20-stamp mill in 1917 with a 300-ton, electrically powered ball mill. The announcement also noted that tailings from the mill would be pumped over the ridge to avoid contaminating the Helena water supply.[621] A large settling pond exists on the ridge between Monitor and Coon Creeks which could date from this period. Another report states that the tailings from the ball mill were de-watered and stored.[622] This could explain the impoundment dam across Monitor Creek below the Columbia mill. The tailings appear to have been dumped from trestles along the edge rather than having been built up behind the dam. A flume runs from several hundred

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[614]"let the Other Fellow do all the Work," Helena Daily 7 September 1915, p. 4.
[615]"Ten Mile is Not Proper for Use Says Riddell," Helena Independent, 10 September 1915, p. 1.
[616]"City of Helena Minute Book No. 2,11 September 13, 1915, p. 303. "City Will Block Mining Activity," Helena Daily 14 September 1915. Schweitzer also wrote that the City of Helena issued an injunction in 1898, but that is riot documented.
[617]"Porphyry Dike Co. is Sued by City," Helena Daily 17 September 1915, p. 5.
[618]Mining and Engineering World, 43 (October 9, 1915) :584.
[619]Mining and Engineering World 44 (January 22, 1916) :179.Although, an earlier cultural resource report of this area credits the Anaconda copper mining Company with extensive operations at the Dike from 1916 to 1926, ACMs involvement appears to have consisted mainly of exploration work and mill runs for testing ore values. Documentation also shows that the replacement of the 10-stamp mill with a 20-stamp mill was not undertaken by the ACM as the earlier report stated, but had been already been completed by James Breen.
[620]See the minutes of the April 23, 1929 meeting of the *stockholders of* the Porphyry Dike Gold Mining Co., Secretary of State's Office, State Capitol, Helena, Montana.
[621]Engineering and Mining Journal 103 (June 2, 1917) :1002; 104 (Novenber 10, 1917) :858.
[622]Geology of the Basin Quadrangle, p. 115.

feet above the dam to the dam and was apparently intended to convey the creek through the tailings without the tailings entering the creek.

The Porphyry Dike mines were the largest, or among the largest, producers in the Rimini area in 1916, 1917 1919, 1923, and 1924. The mines were reportedly idle in 1918, 1925, and 1926.[623] Some exploration work was undertaken in 1926 and it was reported that there were "reserves of millions of tons of low-grade ore containing $1.85 to the ton in gold, which would require an unusually large milling plant."[624] Conflicting with the above reports are articles in professional mining journals in 1929 stated that the Porphyry Dike mines would again reopen after having been closed for fourteen years because of a lawsuit over disposal of the tailings, implying little activity since 1915.[625]

The Gold Cap Mining Co. was incorporated in 1929 to "take over and operate" the Porphyry Dike mines.[626] The company reconditioned the 300-ton mill and connected it to the Montana Power Co. Is transmission line. It also cleared ice out of the tunnel from which it planned to draw the ore from a "mammoth glory hole."[627] The Company shortly changed to "block caving" which it found to be more efficient.[628] The Porphyry Dike property produced almost all of the 4,905 tons of ore mined in the Vaughn District in 1929, which yielded $6,299 in gold.[629] The Porphyry Dike was again idle in 1930.[630] In 1932, William B. Daly, manager of the Anaconda Copper Mining Company mines purchased a majority of the claims on the Porphyry Dike for back taxes and in turn sold the claim to ACM three days later.[631]

The Anaconda Copper Mining Co. continued to consolidate the claim on the Porphyry Dike through the 1940s and 1950s. Pangea Explorations, Inc. purchased the claims in October 1986 and began development of the present mining operation, selling it to the Pegasus Gold Corporation, the present owner, in June 1989.

HISTORICAL OVERVIEW OF MARYSVILLE
By: GCM

William Mayer, who would later discover the Bald Mountain Lode (or Cruse) first, found gold in this area in 1864 along Silver Creek. As more people moved into the area the town of Silver City was established at the lower end of the diggings.[632] When the placers began to run out the miners started looking for gold in the hills. Thomas Cruse,

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[623]See Mineral Resources of the United States for these years.
[624]Mineral Resources of the United States, 1926, p. 401.
[625]Mining Truth, 14 (April 2, 1929) :23.
[626]Ibid. Incorporators were Glen Anderson, R.R. Gains, and Charles O'Farrell of Butte and R.M. Atwater, Jr. of New York, a mining engineer associated with the international banking house of Lodenberg, and Thalman & Co.
[627]Ibid. 14 (April 2, 1929) :23; (May 2, 1929) :24. (June 18, 1929) :24.
[628]Ibid. 14 (July 30, 1930) :47.
[629]Mineral Resources of the United States, 1929, pp. 840 and 863.
[630]Ibid., 1930, p. 417.
[631]See chain of title for these claims at the Basin Creek Mine Office, Helena, Montana. According to Mining Truth 17 (October 19, 1933) :3, the Porphyry Dike mines again changed management in 1933 when the United Gold Mines headed by Clement Quinn of Duluth took over operation from the Breen Estate which still held title to the property. This is not documented in any other source.
[632]Wolle, Muriel S., 1963. Montana Pay Dirt. A Guide to the Mining Camps of the Treasure State. Sage Books, Denver.

an Irishman who arrived in Montana in 1868, and would eventually become the biggest producer in the area, discovered the Drumlummon Mine in 1876.

Development of the area began in the early 1870s as more lodes were discovered and mines opened. Other major mines found in the district include the Bald Butte, Empire, Belmont, Penobscot, Piegan-Gloster, St. Louis, BellBoy and Shannon.[633] Mining camps sprang up at the larger mines such as the Gloster, Drumlummon and Empire. In 1887 when the mines were at peak production, the railroads decided to build branch lines from Helena to Marysville. The Northern Pacific Railroad won the race and was able to complete its track all the way into town by taking the side hills. The Great Northern was unable to get right-of-way under the Northern Pacific trestle and had to terminate its track east of Marysville. The Drumlummon Mine was the major producer in the district and the only mine to be developed below 500 ft.[634] Ore in this district was high grade down to 200 ft but after this it rapidly decreased in value. This caused some of the mines to close after only a few years of operation.

In 1897 a cyanide plant was built to recover gold from the tailings piles held by five dams located along Silver Creek.[635] No placer activity was recorded on Silver Creek until 1933 when some placer mining occurred. A washing plant then was built but proved to be Inefficient. In 1939 a dragline dredge was brought in and the tailings ponds were worked intermittently up to 1948. In addition to the dredge, an amalgamator and concentrator were also used on Silver Creek.[636]

Historical Overview of the Belmont Mine
By: Unknown

The Belmont Claim began yielding ore in 1878. Participants in the original Belmont Mining Company included Nathan Vestel, Spenser Trusk, T. T. Buckley, Rufus Allerton, William B. *Frue,* Leon Mcleod Baldwin, and L. C. Trent. The mine continued operation through what would be the area's major mine disaster, an underground powder explosion at the mine on February 11, 1881 which killed six miners.

Company correspondence indicates that in spite of this, work continued; the mill was modified, equipment updated, and its capacity enlarged in the spring of 1881. Foundation walls were erected in several stages, perhaps to accommodate new equipment and *machinery. Mining* and mill operations were discontinued when *miners reached* water level. By 1885, the mill fell into misuse, and with the possible exception of a brief period of operation by the Longmaid family in 1916, it appears to have remained idle. The Belmont was one of several claim eventual1y purchased by Helena banker

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[633]Barrell, Joseph., 1907. Geology of the Marysville Mining District, Montana. United States Geological Society Professional Paper 57. Government Printing Office, Washington.
[634]Pardee, J. T. and F. C. Schrader, 1933. Metalliferous Deposits of the Greater Helena Mining Region, Montana. U.S.G.S. . Bulletin 842, U.S. Government Printing Office, Washington.
[635]Weed, W. H., 1903. Gold Mines of the Marysville District, Montana. Contributions to Economic Geology, U.S.G.S. Bulletin 213, Government Printing Office, Washington.
[636]Lyden, Charles J., 1948. The Gold Placers of Montana. Montana Bureau of Mines and Geology. Memoir No. 26. Montana School of Mines, Butte.

Thorns Cruse, a former prospector, miner, and discoverer of the nearby Drumlummon lode. It is one of the claims now led the "Cruse Group." (While the complex of claims and mining operations on Belmont Mountain have been referred to as the "Belmont Mine," there has been little mining activity at the Belmont Claim since 1885.)

Radersburg District
By: Western History Research

The Radersburg district is a relatively small mining district approximately seven miles wide (east-west) by six miles long (northsouth). It is bounded on the north by the Hassel mining district and the Elkhorn mining district is found to the west, approximately fourteen miles. The mines of the Radersburg district are all found on the eastern edge of the Elkhorns in Keating Gulch, Johnny Gulch, and the various unnamed gulches to the south. This is a low treeless area of the Elkhorn foothills within one to six miles southwest of Radersburg.[637] The majority of the mines are located in one township, T5N R1W, in Sections 9, 11, 12, 13, 15, 16, 19, 24, 26, 28, 31, 33, and 35. Other mines included in this district are in T5N R1E in Sections 7 and 18, and in T4N R1W in Sections 4 and 17.

Discovery of placer gold in the Radersburg mining district occurred in the 1860s and yielded at least $500,000 in gold.[638] These early mines are generally associated with the mining activity centered in the Helena area. Gold was discovered on Last Chance Gulch in 1864 and soon after the initial rush miners began to prospect the creeks in all directions, including those to the south in what became the Radersburg district.

Quartz lodes were also discovered in the 1860s and by the 1870s lode mining was well underway.[639] Stamp mills were developed in the district to crush the ore and the amalgamation process was used to recover the gold.[640] One of the most important mines in the district was the Keating, which was discovered in 1866 and worked on a continual basis for over a decade. By 1870, a 15 stamp mill was built at the Keating operation to process its ores.[641]

Although both oxidized ores and sulphide ores were mined in the district, the treatment of sulphide ores was not successful at first.[642] According to Corry, the oxidized ores were generally found first, in the upper levels of the mines. As the mines went deeper the sulphide ores were encountered. With the increase in sulphides and the inability to deal with these ores locally mining in the Radersburg district was temporarily stalled.[643]

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[637]Bard, D. C., 1910. "The Radersburg Mining District of Montana and Some Interesting Features of Its Geology." Journal of the Association of En Societies. Association of Engineering Societies, Boston.
[638]Sahinen, Uuno Mathias, 1935. " Mining District of Montana." MS thesis, Montana School of Mines, Butte, Montana., p. 33.
[639]Corry, Andrew V., 1933. "Some Gold Deposits of Broadwater, Beaverhead, Phillips, and Fergus Counties, Montana." Montana Bureau of Mines Memoir No. 10. Montana School of Mines, Butte, Montana.
[640]Bard, D. C., 1910. "The Radersburg Mining District of Montana and Some Interesting Features of Its Geology." Journal of the Association of En Societies. Association of Engineering Societies, Boston.
[641]Pardee, J. T. and F. C. Schrader, 1933. "Metalliferous Deposits of the Greater Helena Mining Region, Montana." United States Department of the Interior. Geological Survey Bulletin 842. Government Printing Office, Washington, D.C.
[642]Sahinen, Uuno Mathias, 1935.
[643]Corry, Andrew V., 1933.

This was the case with the Keating mine, for example, which extended to a depth of roughly 230 feet before the oxidized and partially oxidized ores were exhausted. In 1878, at the depth of 230 feet, the sulphide ores were encountered and the Keating operation was halted.[644]

A small blast furnace was constructed at Toston in an attempt to treat the sulphide ores but this effort was soon abandoned.[645] By the early 1880s the completion of the Northern Pacific Railroad provided a cheap method of transporting the sulphide ores to the smelters and mining activity experienced an increase.[646] The ores were shipped either to Helena or Butte where there were large smelters and economical reduction of the sulphide ores could be accomplished.

Production in the Radersburg district from discovery in the 1860s to 1904 has been estimated at $3,000,000 but this is considered optimistic. Actual production during this period may be roughly 50% of this estimate.[647] The primary metal recovered in the Radersburg district is gold but some other metals are found including silver.[648]

It has been reported that in the period between 1911 and 1933 lode mining has been sporadic with at least one mine in operation each year. During this same period some placer mining was taking place in the district. Estimates of total production for the Radersburg district from discovery in the 1860s to 1928 is placed, conservatively, at $6,130,000. The best production figures for the district are limited to a ten year period between 1902 and 1912. These figures show relatively high production in 1902, a significant decline from 1903 through 1907, and a resurgence of mining beginning in 1908. Some production statistics have been provided for the 1920s but these are believed to be incomplete and do not accurately reflect the total value of production but indicate trends in the operation of the mines in the district.

Mining Near Townsend

The Indian Creek region of the Elkhorn Mountains in southwestern Montana has been the scene of exploration and extraction of precious metals since the last half of the 19th century. This creek provides major drainage to the midsection of the east flank of the Elkhorn Mountains before emptying into the Missouri River near the present town site of Townsend. Mining activity began at Indian Creek in the 1860s, a decade during which precious metals were located throughout western Montana. The prospectors who first found placer deposits at Indian Creek were undoubtedly attracted to the Elkhorn Mountain area by significant discoveries of gold in 1864 relatively nearby at Last Chance Gulch at Helena and at Confederate Gulch in the Big Belt Mountains. By

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[644] Pardee, J. T. and F. C. Schrader, 1933. "Metalliferous Deposits of the Greater Helena Mining Region, Montana." United States Department of the Interior. Geological Survey Bulletin 842. Government Printing Office, Washington, D.C.
[645] Ibid.
[646] Corry, Andrew V., 1933.
[647] Pardee, J. T. and F. C. Schrader, 1933
[648] Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas." U.S. Geological Survey Bulletin 574.

the turn-of-the century, the Indian Creek region in the vicinity of the mining camp at Hassel is estimated to have produced from $2 million to upwards of $8 million in precious metals, mostly from placer workings but some from lode deposits.[649]

Prospectors discovered gold in the gravel of Indian Creek in March 1866. Frank Heald, John Cull and others forming the Empire Company made the find near the west fork of the creek. It immediately attracted other gold seekers who filed adjoining creek bottom claims.[650]

Some of these individuals congregated into a settlement along the creek on the St. Louis claim site. This mining community originally took the name St. Louis, but in the 1890s was renamed Hassel, after one of the early placer miners. Besides housing for miners, by the mid-1870s, St. Louis boasted a well-stocked store, two hotels, a church, a school, and a Knights of Good Templar hall. Most, if not all, of these facilities were of log construction.[651]

Placer mining at Hassel remained active throughout the 1870s. In July of 1875, a newspaper reporter from Helena visited the mining camp and observed several operations hydraulicking, drifting, and "bar digging" for placer deposits on the creek terraces and in the gulches. Water for these purposes was primarily being furnished from Indian Creek via a 3000-foot long flume, set on bedrock, which had just recently been completed, in the "main gulch" below Hassel. Additional water was also being brought to the area, most likely through a system of earthen ditches, from Crow Creek, the next major drainage to the south.[652] The following year, John Murray and Joe McElroy erected another wooden flume to divert Indian Creek waters to their placer diggings. This flume apparently snaked along the northeast wall of the steep canyon area of the creek located about a mile or so east of Hassel. Later the system was augmented by the construction of two reservoirs that stored water obtained about nearly 20 miles to the north from Beaver Creek.[653] A very small remnant of this flume still clings to the canyon wall today.

By 1879, the placer boom at Hassel had come to a close. Much of the terraced areas along Indian Creek stood stripped to bedrock, their placer deposits almost entirely depleted.[654] Although most of the miners moved on, a few remained to dig for gold in the surrounding hillsides.

The Little Giant Mine was one of the most actively developed hardrock mines in the Hassel mining area during the late 19th century. The property was located about a mile east of Hassel on Giant Hill, the most prominent peak in the general vicinity. Although

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[649]Stone, R.W., 1911 Geological Relation of Ore Deposits in the Elkhorn Mountains, U.S. Department of the Interior, U.S. Geological Survey, Bulletin 470, Washington, D.C.: Government Printing Office, 1911).
[650]Helena Daily Herald, 14 July 1875, p. 1.
[651]Broadwater Bygones: A History of Broadwater County (Bozeman: Color World of Montana, 1977), pp. 21-26, note the photograph of early Hassel on page 21.
[652]Helena Daily Herald, 14 July 1875, p. 1.
[653]Broadwater Bygones: A History of Broadwater County (Bozeman: Color World of Montana, 1977), pp. 21-26, note the photograph of early Hassel on page 21.
[654]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage Books, Denver.

it was first claimed in 1867, major developments did not begin until after the property was "relocated" in 1875 by a group of Hassel miners. These were F.D. Heald, Fletcher Foster, W.J. Clark and E.A. Morrison. During June of that year, two men sunk several shafts and encountered east-to-west trending veins in bedrock. These workings yielded seven tons of ore bearing about $1200 in gold. Over the next several years, a 1000-foot long adit and a 1500-foot adit were driven into the hillside following the vein. Despite these efforts, the mine had only produced $300,000 by 1900. Much of the ore values apparently were left in the tailings.[655]

Hassel's largest and most speculative gold mining ventures, however, occurred elsewhere at a cluster of claims on Diamond Hill, a hillside located about a half mile northwest of the mining camp between the west and main branches of Indian Creek. In the 1880s, the Diamond Hill Mining Company, a Scottish syndicate, acquired the earlier discovered Diamond Hill properties. The company extensively explored the deposit, and in the early-1890s erected a 40-stamp mill to process ore recovered from a large glory hole. Undoubtedly encouraged by the recent adoption of the single gold standard the company greatly expanded its operations in 1897, spending approximately $400,000 for construction of a "120-stamp mill, electric plant, water power, dam, etc." This also included a transmission line from Crow Creek where the electrical generating plant must have been located.[656]

Developments at Diamond Hill breathed new life to the community of Hassel. New buildings went up, several new businesses opened, and saloons flourished. In 1897, the school enrollment reached an all-time high of 24 students.[657]

Prosperity at Diamond Hill and Hassel proved short-lived. Almost immediately after the mill was put into operation in late-1897, it shut down because of an insufficient water supply. A reporter for the Engineering and Mining Journal subsequently warned that because of low-grade ore the mill "will require the entire capacity to make it operable."[658] The company attempted to operate the mill for a few more years but only ran at about a third of its capacity, or 40 of the 120 stamps. By 1900, the Diamond Hill mines had only produced $500,000, little more then the company had expended to build the mill. About this time, the Diamond Hill Mining Company closed the plant, sold the mill to a Boston company that moved the facility to its mines at Pony, and dismantled the power line. By this time, Hassel was again a virtual ghost town.[659]

In the early-20th century, placer deposits and hardrock mines at Hassel were sporadically leased and prospected by small groups. Very small quantities of gold, silver and lead were derived in the early-1910s from the Little Giant mine, as well as

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[655]Reed, Glenn C., 1951 Mines and Mineral Deposits (Except Fuels) Broadwater County, Mont., U.S. Department of the Interior, Bureau of Mines, Information Circular 7592, April 1951, p. 90.

[656]Reed, Glenn C., Mines and Mineral Deposits, Broadwater County, p. 45; "Montana Mines in 1897" Engineering and Mining Journal 65 (8 January 1898)

[657]Mines and Mineral Deposits. Broadwatar County, p. 55.

[658]Tenth Annual Reports of the Inspector of Mines of the State of Montana: November 30. 1898 (Helena: Independent Publishing Co. 1899)

[659]Twelfth Annual Report of the Inspector of Mines of the State of Montana: December 1,1900 (Helena: Independent Publishing Co. 1901)

from the adjoining unpatented claim, the W.A. Clark.[660] Much of the ore mined from the Little Giant during this period was apparently left stored on the site, "pending a proper recovery system."[661]

During the decade of the 1930s, a minor revival of mining occurred in the Hassel area. Most of the activity came from local individuals who likely turned to small-scale mining during the Depression to earn money and fill time. Outside capitalists, however, once again proposed large mining developments. In 1931, the Gold Standard Mining Corporation announced plans to build a 150-ton mill with "provisions for other units," at Diamond Hill.[662] In 1934 an eastern firm proposed construction of 300-ton mill to ore the Diamond Hill and Little Giant mines, as well as the Blacksmith mine situated just southwest of Hassel.[663] No physical evidence exists that such large undertakings ever came into being.

Small-scale mining has continued in the area since the 1940s. From dredging activities were conducted along the bed of Indian Creek, considerably lowering and widening the channel bed, and depositing large piles of overburden along the channel margins.[664]

Mining in the Deerlodge Valley
By: GCM

The Deer Lodge valley was settled relatively early because of the agricultural and mineral potential, and its location. The area had abundant water and well-watered hay meadows, and was along the Clark Fork River (then called the Deer Lodge River), the major travel route through western Montana. The early settlers in this area supplied the surrounding mining camps with food. The 1879 GLO plat map for the area shows far less development in the South Fork of Dry Cottonwood Creek. Only a single cabin within the area.

The Oro Fino mining district, as with many mining districts in Montana, was probably organized on the quasi-legal basis of a meeting of miners. The indeterminate nature of early mining districts stems from their historic origin at a time and place where established governmental authority was virtually nonexistent. *Ex post facto* district descriptions were use by mining promoters, geologists, and county recorders as a convenient way to describe a general mining area sharing ore bodies, geological formations, and major mines and mills, or bound by topography or political boundaries such as county lines. Until recently, there had been little need to define a mining district for administrative purposes.[665] Wolle described the Oro Fino mining district as "being on the west slope of the Continental Divide about eight miles west of Racetrack, a

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[660]Mineral Resources, U.S. Department of the Interior, U.S. Geological Survey, production for the Little Giant mine in 1908, 1911, and 1913, and for the W.A. Clark mine in the years 1911, and 1914-1916.
[661]Biennial Report of the Inspector of Mines of the State of Montana, 1911-1912 (Helena: Independent Publishing Company, 1912), p. 43.
[662]Mining Journal 14 (30 April 1931): 43.
[663]Mining Journal 18 (15 June 1934) : 24
[664]Mines and Mineral Deposits. Broadwatar County, p. 55.
[665]Sahinen, Uuno M., 1935 "Mining Districts of Montana", Thesis, Montana School of Mines, Butte.

station on the Northern Pacific and Milwaukee Road railroads.[666] The Oro Fino district is now defined by the Montana Department of State Lands in a recent classification of state mining districts.[667] The district (number 48 in the AMRB system) is somewhat larger than previous descriptions.

Placer mining in Dry Cottonwood Creek and the South Fork of Dry Cottonwood Creek, part of the Oro Fino or Dry Cottonwood mining district, began prior to 1879 as indicated by ditches shown on the GLO plat of that year in Sections 5, 6, and 8, T5N R8W. The length of the creek was undoubtedly tested for gold-bearing deposits and roads were built to access mining properties farther up the Dry Cottonwood Creek drainage.

Beginning around the turn of the century, the upper four miles of the South Fork of Dry Cottonwood Creek became the site of sapphire mining. Sapphires from Dry Cottonwood were pale green in color and were not recognized as a valuable item until the 1890s when some were collected during gold placer operations. Initially two men named Harris and Farell took thousands of sapphires out of the stream. From 1900 to 1903, J. M. Jamieson and his two brothers worked the stream until the water ran out. In 1903, they averaged 15 pounds of sapphires per day and received 70 cents per ounce. In 1902 the Northwest Sapphire Company also mined sapphires in Dry Cottonwood Creek using hydraulic techniques.[668]

In 1904 West Dodd of Des Moines obtained several of the claims on the South Fork of Dry Cottonwood. The next year he bought parts for a very small dredge that was originally bound for South America. This 1-cubic foot bucket-line dredge may have been built by Link-Belt. By 1905 all the parts had been shipped by rail to Deer Lodge and by wagon to Dry Cottonwood Creek. The dredge was completed and ready to operate in 1906. The steam-powered dredge had a 12-foot long trommel and a 3-4 foot wide riffled sluice to catch gold and sapphires. A special pocket at the head-end of the sluice contained mercury. Because sapphires have a much lower specific gravity than gold, a large percentage of the gems found their way to the tailings. The machine was capable of dredging to a depth of 10 feet under normal conditions and 12 feet by lowering the water in the dredge pond. West Dodd named his company the Variegated Sapphire Company, but aside from a licensed engineer hired to work the boiler and steam engines, the operation was a family affair. Dean Dodd and his brothers sorted gems on a table while their father William Dodd retorted the gold. William ultimately lost his teeth from mercury poisoning.

The company was active in Dry Cottonwood Creek from 1907 to 1910. During the first year of operation, gold from a vein hidden under the valley floor bolstered profits, but when the dredge moved away from the vein, the dredge began to be a losing

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[666]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage books, Athens, Ohio.

[667]Abandoned Mine Reclamation Bureau (AMRB), 1994 Mining districts of Montana. Maps 1: 100,000 and Map #94-NRIS-129. Compiled and edited by Joel Chavez. Prepared by Montana State Library Natural Resource Information System (NRIS) for Montana Department of State Lands, Helena

[668]Weed, Walter Harvey, 1900 Montana Sapphires. Mineral Industry, Vol.10: 280-283.

proposition. The family diversified their activity by running a sawmill to support themselves and the dredge. Although the dredge could not meet expenses after 1910, West Dodd allowed his brother and nephews to run the dredge during part of the 1911 season and let them keep whatever gold and gems were recovered.[669] The Dodd's dredging activity were in the South Fork of Dry Cottonwood Creek. The dredge remained there until it was scavenged. According to local reports, nothing remains of the Variegated Sapphire Company's dredge, although three bases from 1-cubic-foot buckets were recovered in 1988.[670]

About two miles downstream from the Dodd's operation, Nat Simon and associates set up a larger dredge. In 1908 or 1909 under the banner of Consolidated Gold and Sapphire Mining Company of Butte, Simon purchased and moved a dredge from Boulder at a cost of $85,000. The machine was a 3 5/8-cubic-foot Ridson bucket-line dredge with around 20 buckets. In operation by 1910, the machine was capable of working the deeper deposits, but poor mineral survey techniques resulted in the dredge working gravel only 6 foot deep. The dredge worked only a small area, a pocket about 100 yards by 50 yards, before it was declared a failure.[671] Simon's Consolidated Gold dredge operated within this area, and although swamped by high spring waters and beaver damming, the gantries are still visible.[672]

The gravel of Dry Cottonwood Creek was of two distinct types. The upper gray gravel was sterile while the lower red gravel, which rested on bedrock, contained the gold and gem values. Gold recovered from the red gravel ran 750 +/- fine ($14 to $15 per ounce at $35 per ounce gold prices) according to mint returns and a cubic yard of red gravel typically carried 25 cents of gold. As mentioned above, the first season, the Dodd dredge apparently worked directly over a gold vein outcrop hidden by the stream deposits; profits improved when the quartz and wire gold showed up in the sluice box. Sapphire values averaged 6 ounces of commercial grade and 50 carats of gem quality stones per cubic yard. The small Dodd dredge was said to have produced around 1000 pounds of sapphires per season. There are no records of sapphire production for the larger Simon dredge, but it probably recovered several hundred pounds of industrial quality sapphires and thousands of carats of gem material.[673]

In addition to low gem and gold prices the Dodd's operation was also hampered by lawsuits filed by Nat Simon. The Dodd dredge had been working claims on section 17 that the Dodds had purchased in good faith. However, the land was deeded to the Northern Pacific Railroad who actually held the mineral rights. In 1907 Nat Simon purchased the railroad land that the Dodds were dredging. In 1910 he also charged that

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[669]New Butte Mining (NBM), n.d.a "History of Sapphires on Dry Cottonwood Creek," New Butte Mining Document #7036 Butte

[670]New Butte Mining (NBM), n.d.b Collection of documents relating to Simon lawsuits against William Dodd. New Butte Mining document #7000. Butte.

[671]Pratt, Joseph Hyde, 1901 The Occurrence and Distribution of Corundum in the United States. U.S. Geological Survey. Bulletin 180.

[672]New Butte Mining (NBM), n.d.c Letter to Marc Bielenberg ret Sapphires on Simon Ranch, 12-22-93. Butte.

[673]Hall, J. H. and M. L. Rickman, 1912 Montana Bureau of Agriculture. Labor and Industry. Thirteenth Report. for Years 1911 and 1912. Helena

Dodd's sawmill was polluting the stream with sawdust. This fouled Simon's dredge's water supply and bothered the cattle that he grazed in the area. By late in the season 1911, Simon's lawsuits had stopped all dredging on the gulch. Most of the Dodd family had gone to Anaconda to find employment. William Dodd spent his time in Butte with his attorneys.

In 1914 Silas Dodd, William Dodd's oldest son, reactivated the dredge and ran it further up the gulch. He managed to work more yardage than any previous year. His activities came to an end when Nat Simon finally obtained the Dodd land and dredge through his lawsuits. However, Simon could not enjoy the fruits of his legal maneuvering because World War I stopped dredging until 1919. After the war Simon was able to dredge for only one season before a cloudburst filled the gulch with debris and topsoil. The new deposits laid down ahead of the dredge made it impossible to work the gravel. The Dodd dredge was abandoned and parts were salvaged in the 1930s. The gulch has seen several additional attempts of prospecting, primarily by the Dodd family who obtained title to a portion of section 16 in 1927, but no further production. Testing and prospecting has occurred as recently as 1994.[674] (Christie 1994). The primary location of the dredging and the mining activity was in the North and South Forks of Dry Cottonwood Creek.

Early Roadways

While several old roadways traverse the Deer Lodge Valley, little early development occurred around the South Fork. The road that ran along the Clark Fork River was a major northwest - southeast route through Montana. An early road along Dry Cottonwood Creek appears to essentially follow the current Forest Service access road (FS road 85). The present road has been graveled, culverts put in, and other improvements made. The only similarity to the early road is the route. It is probable that the route is essentially the same today as the one shown on the 1868-1869 GLO maps because of the general topography.[675]

Homestead and Land Entries

Descendants of West Dodd, and later Nat Simon were the only ones known to have conducted grazing within this area. Most of the agricultural activity took place in a broad, level meadow in the northeast quarter of Section 17, T5N ROW. Marc Bielenberg currently owns this land.

ATLANTIC CABLE QUARTZ LODE
(U.S. Highway Historical Marker)

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[674]Christie, Brian, 1994 "American Gem testing Montana sapphire play." The Northern Miner March 7, 1994.
[675]Fredlund, Lynn, 1994 "Cultural Resource Inventory and Assessment: In Dry Cottonwood Creek, Deer Lodge County, Montana", for New Butte Mining, Inc. by GCM Services, Butte.

This mining property was located June 15, 1867, the name commemorating the lying of the second transatlantic cable. The locators were Alexander Aiken, John E. Pearson and Jonas Stough. They were camped on Flint Creek and their horses drifted off. In tracking them to this vicinity the men found float that led to the discovery.

Machinery for the first mill was imported from Swansea, Wales and freighted by team from Corinne, Utah, the nearest railroad point.

The mine was operated with indifferent success until 1880 when extremely rich ore was opened up - a 500-foot piece of ground producing $6,500,000 in gold. W. A. Clark paid $10,000 for one chunk of ore taken from this mine in 1889 and claimed it was the largest gold nugget ever found.

This highway marker is misleading. The discovery took place in the fall of 1866. The actual lode that became the Atlantic Cable Mine was discovered while digging a shaft in June of 1867. By then the founders were already washing the gold laden quartz float with waters brought by a ditch four miles in length.[676]

Soon there were other discoveries of gold located-on Cable Mountain resulting in the Cable Mountain Gold Mining District. Bohm includes the Red Lion and Georgetown districts within this district since they are located on Cable Mountain.[677] Some of the mines in this district besides the Atlantic Cable are the Southern Cross, Red Lion, Reliance, Pyrenees, Luxenburg, Golden Gate, Gold Coin, Golden Eagle, American Flat, Hanna and St. Thomas.

Dougherty Mill

The mill was built about 1900 by Patrick Dougherty. It was a log structure with three small gravity stamps and amalgamating plates. Ore from several neighboring mines was reportedly milled at this site.[678] Mines that used this mill include the Montana mine to the north and the Robinson Mine in 1906 and perhaps the Hidden Lake mines to the south.[679] The Barich mine, located a quarter mile south treated its ore "in a 3 ton stamp mill on an adjoining property" in 1940.[680] This might refer to the Dougherty mill although it seems unlikely the same mill would still be operating some 30 years later. Huan reports that H.C. Bacorn operated the mill between 1914 and 1919 to process Hidden Lake mine ores.[681] The 1940 Directory of Montana Mining Properties lists an H.C. Bacorn as owner of the Cable Mine in the Georgetown District and having a 30 stamp plant "famous for its rich ore and beautiful gold specimens."

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[676]Emmons, William Harvey and Frank Cathcart Calkins, 1913 Geology and Ore Deposits of the Philipsburg Quadrangle, Montana.
[677]Bohm, W. O., 1906 The Cable Mountain Gold Mining District of Montana. Mining Magazine May, Vol. 13 No. 5, New York.
[678]Emmons, William Harvey and Frank Cathcart Calkins., 1913. Geology and Ore Deposits of the Philipsburg Quadrangle, Montana. United States Geological Survey, Professional Paper No. 78. Washington.
[679] Johnson, Florence Riddle., 1964. Ghost Trails Count. Anaconda, Montana.
[680] Montana Bureau of Mines and Geology., 1940. Directory of Montana Mining Properties, Memoir No. 20. Works Projects Administration, Mineral Resources Survey, comp. Butte, Montana: Montana School of Mines.
[681] Ibid.

PHILIPSBURG DISTRICT
By: GCM

Upper Rock Creek was relatively isolated but participated in the general historic trends of western Montana. Rock Creek was first settled in the early 1880s while most recorded placer and lode activity in the drainage began in the late 1880s. Most mining activity focused on the Philipsburg mining district, which for a brief period during the last two decades of the nineteenth century, was one of the richest silver-producing mining districts in the world. The Philipsburg district is an example of the common cycle which characterized so many of the westem mining districts where an early period of boom and bust would be followed by a long period of gradual, small-scale mining revival. Some of the efforts and mining excitement spilled over into the upper Rock Creek drainage but it never had the rich ore that was centered around Philipsburg.

The first discovery of gold in the area is generally accredited to Francois Finlay who, in 1852, fi:rst noticed placer gold in the gravels near the mouth of Gold Creek~ The mineral deposits of the Philipsburg district were first uncovered by Hector Horton, a California prospector, who found quartz outcroppings while searching for gold in the Flint Creek valley during the fall of 1865. He staked the Cordova lode on the Hope Hill which set off a rush to the area the following spring.

In June of 1867 the camp, which would become the town of Philipsburg, was fi:rst laid out along a small tributary of Flint Creek, just south of the Hope mine. By the end of the year, the town had 250 houses, one hotel, six general stores, seven saloons, three blacksmith shops, two breweries, three livery stables, several restaurants and bakeries, and an imposing two-story Masonic Hall which cost $6000.[682]

Yet, such were the uncertainties and vicissitudes of western mining camps, that by 1869 the camp was a deserted ghost town. The mines had found few pockets of rich ore and transportation costs were prohibitive. Within a short time, however, the district began to revive. By 1873 many of the mines had reopened and by the following year the Northwest Company had been formed to operate several of the mines and mills. In spite of these developments, mining was in a general slump throughout the 1870s due to transportation problems and the lack of high-grade ore. Even though the Philipsburg district once again appeared to be on the verge of a complete shut down, it was actually about to undergo the biggest boom period in its history. In 1883 the Northern Pacific Railroad's transcontinental route reached Drummond, considerably cutting the cost of shipping ore which were then even further reduced when a spur line was completed from Drummond to Philipsburg in 1887.[683]

The main reason for the sudden revival of the Philipsburg district's fortune was due to the development of the Granite mine. Although first discovered in 1872 the property was slow to reveal its potential. It was not until 1880 - after Charles D. McLure, the

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[682]Wolle, Muriel Sibell, 1963. Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State Sage Books, Denver.
[683]Emmons, William Harvey and Frank Cathcart Calkins, 1913. Geology and Ore Deposits of the Philipsburg Quadrangle, Montana: United States Geological Survey Professional Paper 78. U.S. Government Printing Office, Washington, D.C.

superintendent of the Hope mill, assayed a specimen from the Granite dump, which ran 2000 ounces of silver to the ton - that the incredible wealth of the property became known. McLure and Charles Clark organized the Granite Mountain Mining Company with support from a group of capitalists in St. Louis and began large-scale development of the mine. Within two years the investment paid off with the discovery of a massive ore body which assayed 1700 ounces of silver to the ton.[684] For the next decade the mine was one of the biggest silver producers in the world.

Once again, the prosperity was temporary. In 1893 the repeal of the Sherman Silver Purchase Act sent silver prices plummeting and virtually over night the Philipsburg district collapsed as the mines and mills shut down, in many cases, for good. Like Philipsburg in 1869, Granite became a ghost town for the next three years. It appeared to be at this time that prospecting increased in upper Rock Creek. Limited placer exploration undoubtedly began in the late 1860s but most efforts were apparently in the 1890s when gold was found in Basin Gulch by Sammy Watson.[685] Although there are many claims in Rock Creek, both placer and lode claims, few operations were ever developed beyond the exploration stage. Ile exceptions are the Silver King on upper Rock Creek, several miles south of Williams Gulch, and the Golden Scepter on lower Rock Creek. The latter caused a major mining boom in the late 1895 and 1896 when the Golden Scepter Mine and the town of Quigley were booming. It was a short-lived operation, which operated longer than it should have because of a scam by promoter, George Babcock.[686]

In Philipsburg, mining was resumed on a limited scale at the Granite mine, until 1905 when low silver prices once again forced a shutdown. However, by 1900, 100 men were back at work, but each following year the operation produced less and less until 1913, when water flooded the lower levels of the mine. Some mining continued under leasing arrangements until 1920 when the Philipsburg Mining Company succeeded the Granite Bimetallic Company.

The Philipsburg mining district did enjoy modest success in manganese mining. The presence of rich manganese ore in the district was known during the silver boom period but there was little demand and transportation costs were too high to justify mining it. In 1900 about 150 tons of manganese ore was shipped from the Coyle mine. Nothing more was produced until 1916 when World War I created a demand for manganese. During the war years, the district produced 189,972 tons of crude ore and concentrates containing 35 percent or more manganese. With the war's end cheaper foreign sources of manganese again became available, pricing Philipsburg Manganese out of the market.[687]

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[684]Ibid.
[685]Siria, C. H., n.d. Rock Creek: past and present. Unpublished manuscript on file at Lolo National Forest. Missoula.
[686]Hilmo, Glen, n.d. The Rocky Fork of the Clark Fork. Unpublished manuscript on file with Lolo National Forest. Missoula.
[687]Goddard, E. N., 1940. Manganese Deposits at Philipsburg, Granite County, Montana, United States Geological Survey Bulletin 922-G. U.S. Government Printing Office, Washington, D.C.

In time manganese ore from the Philipsburg district was found to be ideally suited for drycell batteries, prompting a steady shipment of 5000 to 28,000 tons yearly for the next 20 years. By 1939 the Philipsburg district produced a total of 477,040 tons.

During World War II the government stockpiled manganese ores and about 40,000 tons (plus a considerable amount of low-grade ore) came from the Philipsburg district. In 1951, under provisions of the Defense Production Act, manganese purchasing depots were established at Philipsburg and Butte and two years later the act was amended to allow for the purchase of low-grade manganese ores. Since the 1950s small-scale mining exploration efforts have been conducted in the upper Rock Creek drainage.

The Philipsburg district has been one of the more productive mining areas in Montana. From the beginning of mining to 1904 the district produced an estimated $39 million, of which about 90 percent was in silver. From 1904 to the present, the district produced about 24 million ounces of silver, 83,000 ounces of gold, 80 million pounds of zinc, 23 million pounds of lead and four million pounds of copper for a total value of almost $30 million.[688]

This production pattern of the Philipsburg district was typical of many other mining districts where an initial bonanza period, lasting just a decade or two, was followed by a half a century of small-scale, internmittent operations. The first period essentially amounted to high-grading operations which exploited the richest deposits of silver and gold. Ile mining and milling techniques were often inefficient and wasteful but, so rich were the ores, it did not matter. Thousands of miners and other workers were employed, large mining camps sprang up over night and great fortunes were made. The early development of the Montana territory was the direct result of the initial mining boom. Even though eastern and/or foreign investors often suffered heavy losses from investments in western mines, successful mines helped fuel both the national and state economies. The impact of the Philipsburg district on Rock Creek was as a spill-over of efforts and development of minerals on Rock Creek was continually over-shadowed by other areas -- a fact which has been responsible for maintaining its relatively unaltered landscape.

GARNET AND TOP 0' DEEP DISTRICTS
By: GCM

Initially, only placer deposits were worked in the Garnet district even though the rich Grant and Hartford, Lead King, and Shamrock lodes were discovered in 1867. Although numerous small underground mines developed throughout the district with the ore being processed in arrastras along Bear Creek, large-scale production in the **district did not get underway** until the mid1890s. The first major lode mining did not occur until 1886 when B. A. C. Stone worked the Haparanda Lode above the Top o'Deep district. In 1896 the Nancy Hanks ore body, which had been discovered by Sam Ritchey in 1873,

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[688]Prinz, William C., 1967. Geology and Ore Deposits of the Philipsburg District, Granite County, Montana: United States Geological Survey Bulletin .1237. U.S. Government Printing Office, Washington, D.C.

was developed after a rich vein of red ore was found in a shoot off the mine's old shaft. The Nancy Hanks mine became one of the mainstays of the district for the next three years and then continued to produce intermittently until 1907, at which point it had produced about $300,000. Other important mines followed the Nancy Hanks during this period including: the Tiger, Dewey, International, Grant and Hartford, Robert Emmett, Minnie Palmer, Fairview, Shamrock, Magone and Anderson, and the Crescent-Lead King-Red Cloud group.[689]

During this early period most of the ore from the district was shipped to smelters in Butte or Helena, although small amounts were milled at the mines. The ore was hauled by wagon 10 miles to Bearmouth and then delivered to the Northern Pacific Railway or the Chicago, Milwaukee and St. Paul Railway for shipment to the smelters. A recovery rate of 80 to 90 percent of the gold and silver was obtained from the oxidized ore. Small amounts of copper and lead were also recovered. During this early period from 1867 to 1916 an estimated $1,500,000 worth of ore was taken from. the district.[690]

The town of Garnet also reached its peak during this period. The first post office was established in 1896. Originally, the town was called Mitchell, after Dr. Armistead Mitchell who set up the first stamp mill in the area, but then it was changed to Garnet in 1897. At this point the town had 13 saloons, four hotels, a school, two barber shops, three livery stables, a candy shop, an assay office, a butcher shop, a doctor's office and daily stage service to Bearmouth. Some twenty mines were in operation around the community.[691]

In August of 1900, Samuel Ritchey leased the Nancy Hanks mine to Colonel L. C. Parker, who would himself drop the lease within two years. Other mines followed this pattern as the richer veins of ore were depleted. The Anderson and Magone, Shamrock, Lead King, and Mussigbrod mines continued to operate, but on a reduced scale under lessees. The town of Garnet declined with the mines and by 1905 it was reduced to around 200 persons. In 1912 a fire destroyed almost half the town and by 1920 it had become virtually a ghost town, although the post office stayed open until 1928. Little mining was done during the 1920s but with the 1934 action of President Roosevelt raising the price of gold to $32 an ounce, interest revived and many of the old mines were reopened. Production continued from the Nancy Hanks, Shamrock, Magone and Anderson, and the Crescent-Lead KingRed Cloud group, with smaller amounts produced by the Robert Emmet, Free Coinage, and San Jose mines. Production again came to a halt during World War 11 when the government closed down non-essential gold mines as part of the war effort. Some production resumed following the war but by the early 1950s the productive period of the Garnet district appeared to be at an end, with last recorded ore shipment occurring in 1955. By this point all the known accessible quartz-gold veins had been worked out and any remaining ore would most

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[689]Pardee, J. T., 1918. Ore Deposits of the Northwestern Part of the Garnet Range, Montana. United State Geological Survey Bulletin 660. Contributions to Economic Geology 1917. Part I.-Metals and Nonmetals Except Fuels. Government Printing Office, Washington, D.C.

[690]Ibid.

[691]Cheney, Roberta Carkeek, 1983. Names of the Face of Montan Mountain Press Publishing Company, Missoula.

likely be low grade and unprofitable to mine. However, some development work has continued sporadically from the 1960s through the 1980s although no further production of any consequence has been reported.[692]

Even though most mining in the district since 1916 has been Small-scale, intermittent operations, production in the Garnet district was greater than it had been during the pre-1916 period. More efficient techniques for reworking old mine tailings and higher prices for metals have resulted in the production of about $2,099,000 worth of gold and silver - plus small amounts of lead, zinc and copper - bringing the district's total production to around $3,599,000 and making it the most important of the lode-mining districts in the Garnet Range.[693]

The Top o'Deep mining district was a small mining camp to the east of Garnet which was most active during the 1860s as a placer camp. Some lode mining was conducted during the 1890s but was limited by constant litigation. Total production was estimated by Pardee to have been around $50,000 although Cushman reported an extremely rich claim was located in the district which yielded $240,000 in gold.[694]

The Austin was apparently a small operation on the Austin claim which was opened and produced for a few years during the 1930s. The 1938 Mineral Yearbook lists the Austin as a gold, silver and copper mine which shipped low-grade ore for smelting in 1936 and 1937. It is unlikely the mine was a major producer or was active for more than a few years.[695]

The Sierra mine, located on the Sierra claim a few hundred feet west of the Austin, was reported to have produced a small amount of medium-grade ore during the late 1890s. At the time of the 1903 survey, the mine had four discovery shafts, a discovery tunnel, nine other shafts, two tunnels, drifts and raises, and a house - all valued at $14,120 which would indicate a moderate sized operation. Ile Austin appears to have been an attempt to reopen the vein worked by the earlier Sierra mine operation. No records were available which would indicate the mine ever produced any significant amount of ore. Some development work was done at the site in the early 1980s but no production resulted from the effort.[696]

The Grant and Hartford was a moderate-sized gold mine which was active before 1910. The Henry Grant and James Hartford Lode was first located by the Butte and Garnet Gold Mining Company on October 16, 1875. The claim was surveyed in September of 1904 and was shown to have a discovery shaft, tunnel and winze valued at $2000. Most of the mine's productive period apparently occurred during the next few years when an estimated $30,000 worth of ore was taken from the mine. At this point, the mine consisted of the main adit which drove eastward into the Magone and Anderson claim.

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[692]Kauffman, Marvin E. and F. N. Earll, 1963. Geology of the Garnet-Bearmouth Area, Western Montana. Montana Bureau of Mines and Geology Memoir 39. Montana School of Mines, Butte.
[693]Ibid.
[694]Pardee, J. T., 1918.
[695]GLO Mineral Survey Plat Map No. 6971-2-3-4-5.
[696]Ibid.

The mine car tracks from the adit to the dump ran over a trestle which crossed the road from Garnet to Bearmouth. Pardee reported there was also a winze, with short levels, sunk 200 feet on the vein, plus another adit level on the west side of First Chance Gulch. By 1912 and 1913, however, the mine's main adit was used only for removing ore from the adjacent Magone and Anderson mine.[697]

Following this early productive period the mine, although owned by the Butte and Garnet Gold Mining and Milling Company, was operated by lessees. The mine was worked only intermittently through the 1920s and 1930s. The ore was hauled to Bearmouth where it was taken by the Northern Pacific Railroad to various mills for cyanidation. There are no records of any further ore shipments after 1940.[698]

The Herzer and Green mine was a small operation located on the south slope of Anderson Mountain. The mine was on unpatented ground and apparently operated for a few years during the late-1930s. In 1940 the mine had a 60-foot shaft and three tunnels. The gold and silver ore was either shipped or processed at the mine in a five-ton, gasoline powered Gibson mill. The mine employed four men who handled about 300 cubic yards of ore per day. The mine was shut down shortly after and has not been reopened.[699]

In 1904 the Magone and Anderson Prospect mine was being run by Tom Anderson through four tunnels and a shaft with a vertical depth of 2500 feet. The mine was reported to have shipped one car load of high grade ore which averaged $80 to the ton. Although considerable work was done on the property before 1910, the mine's most productive period was from 1910 to 1914. During that period the mine was reported to have produced about 2600 tons of ore in addition to working ore from old dumps. The ore was estimated to have been worth over $150,000 which brought the mine's total production up to about $300,000. The ore was of a highgrade with some shipments running as high as five and one-half ounces of gold, six and one-half ounces of silver plus small amounts of copper per ton of ore. During this period the working entry to the mine was through the main adit level of the Grant and Hartford mine. Most of the ore was taken from a cross cut known as the Magone and Anderson tunnel No. 5 which was located about 80 feet above the entry tunnel.[700]

Following this period, the company's charter expired and it was reorganized as the GarnetButte Gold Mining Company. Ile mine continued to operate under lessees who engaged in small-scale mining and development work during the 1930s. From 1940 to 1942 the mine was reported to have produced 20,000 ounces of gold and 20,000 ounces of silver before the mine was closed in 1942 by government order which shut down all non-essential gold mining during World War 11. The mine was not reopened following the war and has remained inactive.[701]

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[697]Pardee, J. T., 1918.
[698]Mineral Yearbook 1935, 1940.
[699]Mace, Gene, 1988. Personal communication, October 12, Clinton, Montana.
[700]Pardee, J. T., 1918.
[701]Trauerman, Carl J. and Millard L. Reyner, 1950. Directory of Montana Mining Properties, 1949. Montana Bureau of Mines and Geology Memoir No. 3-1. Montana School of Mines, Butte.

Mining in the Top o'Deep district, located about four miles east of the Garnet district, began in the mid- 1860s when placer claims were first worked. Gold-bearing quartz veins were uncovered by these early placer workings and some of the veins were worked at shallow depths although little substantial lode mining occurred until later in the nineteenth century.

The Mountain mine apparently was first operated around the turn of the century. By 1916 it was the only lode mine still in operation in the Top o'Deep mining district. The mine, operated by H. P. Hanifin and located on unpatented ground on the western rim of the basin at the head of Deep Creek, consisted of shallow workings only 40 feet below the surface with about 50 feet of drifts. Previous operators were reported to have produced one carload of ore that yielded 16 percent copper but little or no gold and silver. There are no records of this small operation remaining active beyond 1916.[702]

Minor shipments of ore from the district were reported in 1918, 1921-1926, 1931 and 1953 but the total value of the shipments probably did not amount to more than $5000. It is unlikely any major underground mining will occur in the district in the near future, although some of the placer workings are reported to still have potential for profitable mining and the Mountain mine is reported to contain a large vein of ore which shows 15 percent copper.[703]

The Mountain View mine was a moderate-sized operation located on unpatented ground about a half mile east of Garnet. (The Lakawana Gold Mining Company operated the mine for a time during the early 1930s.) In 1937 it was taken over by Mountain View Gold Mines, Inc. The company apparently mined the property for about two years before closing down on September 1, 1939. During the period of operation the company opened over 2000 feet of tunnels, drifts and stopes. Ore was processed in a 25-ton mill at the mine. There are no records of the mine's production during this period nor of any production during the period following World War II. In the 1960s the property was owned by John Khor and operated by Tim Colver of Drummond. Some development work was done on the property in 1965 but no production was reported.[704]

The area along the upper section of Kearns Creek, where the Peggy Ann was located, was originally a placer operation. Frederick Eggers, Patrick Birningham, Henry Epple, Louis Hashel and Zachariah Brown worked the creek bottoms throughout the area during the 1870s. The diggings, in 1880 had 800 feet of sluice boxes, about three miles of ditches, five reservoir and seven cabins. Running under the placer claims and south of the Peggy Ann, was the Old Columbo Lode, claimed by Charles Warner and the Switzerland Lode claimed by Henry Uhler. Neither claim appears to have been mined. In the immediate vicinity of the Peggy Ann was a small operation known as the

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[702]Pardee, J. T., 1918.
[703]Mace, Gene, 1988.
[704]Geach, Robert D., 1965. Directory of Mining Enterprises for 1,964. Montana Bureau of Mines and Geology Bulletin 46. Montana School of Mines, Butte.

Spokane mine. Pardee (1918) reported the mine produced a small amount of rich ore which yielded about $3000. The mine probably operated during the 1890s and by 1916 the workings were no longer accessible. The Peggy Ann was another small operation in this vein which was reported to have operated for a brief period around 1918. The mine may have operated intermittently during the 1920s and 1930s and the Mineral Yearbook for 1940 reported a small amount of ore had been shipped in 1939. Some development work was reported on the property during the 1980s but no ore was shipped from the mine.[705]

The Shamrock was one of the Garnet district's first major lode discoveries when Samuel Ritchey located it in 1867. Like many of the other lodes, it was not developed until the 1890s and Ritchey did not file a claim on the property until April 1, 1897. Ritchey worked the mine during the late 1890s and then sold out to J. S. McDermott around 1904. At that time, the mine had its own 10-stamp mill with a plate amalgamator and concentrator, a large boiler and steam winch; extensive wooden buildings and a 60-foot incline shaft to reach the mine workings. The Mining World on February 24, 1906 reported that Ritchey shipped upward of $400,000 worth of ore during the period he ran the mine. Although this figure is undoubtedly exaggerated, the mine was one of the more productive in the district and, as Pardee (1918) reported, it probably did ship more than $100,000 in ore before 1916. Production was reported to have declined in 1907 and apparently continued to dwindle until the mine was closed around 1913. The mine was reported to have operated intermittently in recent times but no figures were available on the extent of production.[706]

The Willie mine was a small operation located on unpatented ground on the east side of First Chance Gulch about half a mile south of Garnet. Pardee (1918) reported that a large quantity of ore was taken from a quarry on the property. The ore was shipped sometime prior to 1916 and was said to have yielded from four to I I dollars per ton. An adit was driven into the lode from a ravine near the quarry but there is no record of any further production from the mine after 1916. Part of the quarry and the adit were in the Free Coin claim of First Chance Mining Company (who also held the Lead King, Crescent and Bull's Eye claims). The claim was granted on July 26, 1893 and therefore it would seem likely the operation of the Willie mine was part of this company's operations in the area during the 1890s.[707]

MINING IN THE BIG BLACKFOOT
By: HRA

Although John F. Grant erected a log home and engaged in trading and cattle raising at the mouth of the Little Blackfoot River in 1855, it was mining that led directly to the first permanent settlement of what is now Powell County. Stories circulating in the early days of Montana's history attributed the first discovery of gold in the State to Francois Finley, a fur trader with the Hudson's Bay Company. Finley, also known as Benetsee,

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[705]Mace, Gene, 1988.
[706]Ellingsen, John D., 1970. Garnet: The Typical Ghost Town. Unpublished manuscript, Montana State University, Bozeman.
[707]Mace, Gene, 1988.

reportedly found evidence of gold at Gold Creek in 1852. Governor Isaac Stevens discussed rumors of gold being found in the Clark Fork River Valley when he issued his report for the railroad survey. In 1858 Granville Stuart and companions discovered placer gold at Gold Creek, a discovery that brought on the Montana gold rush.[708]

In the vicinity of Lincoln, placer mining occurred as early as 1865 when two mining companies opened operations on Abe Lincoln Gulch.[709] Although it is likely that prospectors during' that era combed the hills around Lincoln and the surrounding area, no paying placers were discovered.

When the Northern Pacific Railway completed its line through Montana in 1883, it made lode mining economically feasible, and a new type of mining centered in the area. The lode operations mined mainly gold and silver. 'The ore was crushed and transported by wagon to the nearest railroad for shipment to out-of-state smelters. Of the eight larger mining districts in Powell County, the Big Blackfoot (Helmville) District has produced the least value in ores. Gold production from the district for the period from 1870 to 1959 was valued at $95,000 as compared to more than $3.5. million derived from gold production in the Ophir District (seven miles northeast of Avon and Powell County's most productive) during the same period.[710]

LOGGING AND LUMBERING:

Logging and lumbering in Powell County and Western *Montana* as a whole received a big boost with construction of the Northern Pacific Railroad in the early 18801s. *Construction of* the road itself created the first significant demand for processed timber, and, once completed, the railroad provided economical access to other markets.

A. B. Hammond and associates formed the Montana Improvement Company in 1881 and secured a contract from the Northern Pacific Railway Company to provide timber, ties, and milled wood products for a 200-mile section of the railroad line then under *construction. The* Montana Improvement Company erected two sawmills, one at Bonita and one at *Clinton. Following* completion of the railroad, the Montana Improvement Company took advantage of the new marketability for area timber offered by the railroad. A big market was found in the expanding mining enterprises in Butte. In 1885 Hammond relocated and expanded his former Clinton mill at the site of Bonner, Montana, named for Edward L. Bonner. The mill, too, was renamed to The Big Blackfoot Milling Company. As the mines in Butte grew, so also did the demand for mining timbers from the Bonner sawmill. In 1898, Marcus Daly purchased the Big Blackfoot Milling Company on behalf of his Anaconda Copper Mining Company (A.C.M.).[711]

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[708]Montana State Engineer, Water Resources Survey: Powell County, Montana (Helena, 1959), pp. 8-9.
[709]Robert Cheney, Names on the Face of Montana (Missoula: Mountain Press Publishing Co., 1983), p. 159.
[710]Montana State Engineer, Water Resources Survey, pp. 22-24.
[711]Bob Bateman, Big Blackfoot Railway (Missoula, 1980), p. 1.

JEFFERSON COUNTY MINES
By: Daniel F. Gallacher (HRA)

The mining frontier in Western Montana was established in the early 1860's with the early gold discoveries at Bannack in 1862, at Alder Gulch (Virginia City) in 1863, and at Last Chance Gulch (Helena) and Confederate Gulch (East of Helena), in 1864. Many other gold camps opened up in west central Montana during the middle and late 1860's. Most of this early mining was placer mining for the first decade, but lode mining began in 1864 with the discovery of the Whitlatch-Union gold vein. The discovery of this famous deposit stimulated further search for lodes in the area. Within a year, several other silver-lead deposits, including the Gregory Lode near Wickes, had been located.[712]

Samuel T. Hauser of Helena was one of the first and most influential of Montana's silver promoters. He helped organize the St. Louis and Montana Mining Company in 1866, which erected Montana's first silver smelter at Argenta in December 1866. Soon thereafter the firm shifted its attention to Flint Creek near Deer Lodge. The Stuart Mill, the first one employing the pan amalgamation process in Montana, was built there in 1867. The town of Philipsburg grew up at Flint Creek to serve the local mill and mines. These operations shut down in the late 1860's and opened up again in the 1880's.[713]

The exploitation of these early lodes was initially successful, because the upper parts of most of the gold-bearing lodes contained free-milling ore.[714] Also, these early lodes were so rich that it was economically feasible to ship them to distant points. Small lots of silver-lead ore were hauled by ox teams to Fort Benton and then by boat to St. Louis and to the eastern seaboard. Some attempt also was made to work the sulfide ores at crude smelters like the one in Argenta and at the Gregory Mine in 1867, the second smelter established in Montana.[715] However, the ores of the region contained too much gangue to permit successful smelting by means of the American hearth used at these early smelters.[716]

Until the early 1870's, quartz mining production, especially for silver, remained low. Silver was less valuable than gold and harder to treat. The technological sophistication needed to work the many amalgams of ore in which the silver was found was also lacking. Transportation costs for machinery and construction materials freighted in and ore shipped out were high. Skilled quartz miners were not available. The capital needed to finance the construction of stamping mills, smelters, and concentrators also was lacking.[717]

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[712]J. T. Pardee and F. C. Shrader, Metalliferous Deposits of the Greater Helena Mining Region, Montana, U. S. Department of the Interior, U. S. Geological Survey, Bulletin 842 (Washington: Government Printing Office, 1933), pp. 183-185.
[713]Michael P. Malone and Richard B. Roeder, Montana: A History of Two Centuries (Seattle: The University of Washington Press, 1976), p. 141.
[714]Ibid., pp. 140-144.
[715]Adolph Knopf, Ore Deposits of the Helena Mining Region, Montana, U. S. Geological Survey, Bulletin 527 (Washington, DC: Government Printing Office, 1913), pp. 16.
[716]R. N. Roby, W. C. Akerman, F. B. Fulkerson, and F. A. Crowley, Mines and Mineral Deposits, Jefferson County, Montana, Montana Bureau of Mines and Geology, Bulletin 16 (June, 1960), p. 44.
[717]Malone and Roeder, Montana, pp. 140-141.

The lode mining that did occur in west central Montana suffered a severe setback with the panic of 1873. Investments in mining and railroad construction declined sharply. This also was the time that the placers and the upper, easily mined parts of the gold quartz lodes were played out. Some Montana promoters continued to operate and some high-grade ore reached Fort Benton and Corrine during the mid 1870's, after the Union Pacific was completed in 1869. From there the ores were sent to California, Germany, and Swansea, Wales, for smelting.[718]

The mid-1870s witnessed major developments of silver quartz mining in Western Montana. The worst effects of the depression began to wear off. Some low-grade ore was converted at Argenta and ore also was sent to new ore refineries in Utah. Experienced silver miners also began to arrive in Montana.[719]

At this time, Butte, Montana began its rise as a mining center and eventually was to become Montana's largest silver and copper producer. Placers were discovered there in 1864. Major lode operations began in 1876, with the construction of the Dexter Mill by William L. Farlin and the Centennial Mill by John Howe. Charles D. McClure played a major role in organizing the Granite Mountain Company and the Bimetallic Mill in Philipsburg. The Granite Mountain operation at its peak was one of the world's largest producers. Helena experienced a major quartz boom with the discovery of the Drumlummon Mine in 1876 and the arrival of the Northern Pacific Railway in 1882-1883.[720]

The arrival of the railroads in Western Montana in 1880-1883 dramatically accelerated the development of the silver mining industry. The improved transportation made it possible to send more ore to distant smelters and reduction works. As a result, more finished metals entered the national markets and Montana became the second largest supplier of silver in the county between 1883 and about 1895.[721]

The silver lode mines south of Helena in the Jefferson City/Wickes/Corbin area (Wickes District) shared in this money boom. In the late 1870's Samuel Hauser shifted his attention from Philipsburg to this area, and began buying and consolidating claims and organizing eastern investors. In 1876, a syndicate of New York capitalists led by William W. Wickes and Charles N. Morgan, together with Cole Saunders, a mining promoter of Helena and Philipsburg, organized the Montana Company and built a large reduction-smelting works at the town of Wickes in 1877. Hauser's Helena Mining and Reduction Company gained control of the Wickes complex in 1883, after making arrangements with the Northern Pacific Railway to build a branch line, the Helena and Jefferson County Railroad, from Helena to Wickes.[722]

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[718]Ibid., pp. 142.
[719]Ibid., pp. 142.
[720]Ibid.
[721]Ibid., pp. 142-143.
[722]Ibid., p. 144; John W. Hakola, "Samuel T. Hauser and the Economic Development of Montana: A Case Study in Nineteenth Century Capitalism," Ph.D. Dissertation, Indiana University, 1960, Chapter VIII.

Hauser's expansion of the Wickes plant and the lower shipping rates stimulated the organization of several new companies in the Wickes mining district. Hauser was involved with a number of these. The Helena Mining and Reduction Company relied on these smaller operations, as well as its own Alta and Comet Mines, to keep it supplied with ore from the surrounding area. The Wickes Complex became the center of operations throughout the region south of Helena and processed ores from as far away as the Coeur d'Alene district of Idaho.[723]

The period from 1883 to 1893 produced most of the silver and lead ore taken from the Wickes District.[724] Periods of major activity in the history of the Wickes district are associated with the production of specific mines--the Gregory Mine in the early 1880's, the Alta Mine from 1883 to 1893, the Comet Mine in 1900 and the Minah in 1900-1901. A drop in silver prices in 1892 spelled the end to the major activities at the Wickes smelter. It was shut down in 1893 and ores were thereafter shipped to East Helena and Butte for treatment. The railway between Wickes and Helena was shut down in 1900 and the prosperity of Wickes had disappeared.[725]

After the silver panic, little money was available for exploration or development. Later mining operations were smaller than the early ones. Ore deposits largely had been depleted, and expanding operations by further construction of tunnels and shafts was no longer economically feasible. About 1896, the Alta mine was closed for these reasons. The Wickes smelter was dismantled and moved to East Helena.[726] A minor copper boom occurred in the Wickes District but ended with the panic of 1907.[727] Most of the mining that occurred since 1900 consisted of mining unmined parts of older mines or reworking tailings. The rise of silver prices between World War I and World War II and the rise of gold prices in 1933 led to some renewed mining activity.[728]

Exact metal production from the Jefferson City quadrangle is impossible to determine. Records are incomplete. Also, the unorganized mining districts overlap quadrangle boundaries, but most of the more productive mines in six mining districts (the Rimini, Clancy, Wickes, Amazon, Boulder, and Cataract Creek Districts) are within the Jefferson City quadrangle. Production from six of the largest mines before 1904 is estimated at $55 million. Between 1904 and 1950 the six mining districts produced about 241,000 ounces of gold, 8,647,000 ounces of silver, 58,945,000 pounds of lead, 32,107,000 pounds of zinc, and 7,706,000 pounds of copper. These amounts had a gross value 18 at the time of production of over $23,478,000.[729]

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[723]Knopf, Ore Deposits of the Helena Mining Region, p. 16.
[724]Ibid., P. 17.
[725]Pardee and Shrader, Metalliferous Deposits of the Greater Helena Mining Region, pp. 189-223; Knopf, Ore Deposits of the Helena Mining Region, p. 108.
[726]George F. Becraft, Darrell M. Pinckney, and Sam Rosenblum, Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana, U. S. Geological Survey, Professional Paper 428, prepared on behalf of U. S. Atomic Energy Commission (Washington: U. S. Government Printing Office, 1963), p. 36.
[727]Ibid.
[728]Ibid.
[729]U. S. Geological Survey, 1901-1923; U. S. Bureau of Mines, 1924-1950, as cited in Roby et al., Mines and Mineral Deposits, Jefferson County, pp. 45.

About one-third of that amount came from the Wickes District between 1902 and 1957. During that time, the District produced 30,673 ounces of gold, 3,472,658 ounces of silver, 4,880,706 pounds of copper, 27,254,784 pounds of lead, and 9,717,803 pounds of zinc from 714,087 tons of ore. Total value in terms of recoverable metals was $7,483,586.[730] About $80 million was produced from the six districts during this time period.[731]

The Gregory mine as defined by the Department of State lands consists of the Belle of the Belleville, (MS 860), Flagstaff (MS 2122), Gregory (MS 427 & 428), and Matchless (MS 1634) mining claims in Section 4, TO, R5W. Historically, the mine has consisted of the Gregory, Matchless, Compromise and Banner claims.[732]

The Gregory mine was discovered in 1864 and is generally considered to be the first silver-lead deposit to be mined in the Wickes region. It is believed to be the site of the second smelter in Montana Territory, which was built at the Gregory Mine in 1867. Early mining results at the Gregory mine were significant enough to warrant smelting works to process the ores. The American hearth was the process selected, but the ores contained too much gangue to be smelted successfully. In the late 1870's, two smelters were constructed near Wickes.[733]

Most of the claims that compose the Gregory Mine group were worked in the 1860's but were not surveyed until the 1870's and 1880's. The Compromise lode and millsite was surveyed in 1872 and patented in 1872 to Thomas J. Lowrey. The Gregory lode and millsite was surveyed in 1876 and patented to the Gregory Mining Company in 1876. The Banner lode was surveyed in 1882 and patented in 1882 to the Banner Company. The Matchless lode and millsite was surveyed in 1885 and patented in 1889 to Harry W. Child. These claims subsequently were deeded to the Helena-Livingston Smelting and Reduction Company, which consolidated with Samuel T. Hauser's Helena Mining and Reduction Company, owner of the Alta property.[734]

The Helena-Livingston Smelting and Reduction Company owned these properties until the 1960's when they were deeded to the Helena Silver Mines, Inc. The Belle of Belleville lode, claimed by Thomas H. Coutter, Benjamin C. Brooke, and Edwin W. Toole, was surveyed in 1881 and patented in 1884 to George F. Cowan. It was subsequently owned by J.K. and E.W. Toole, Jefferson County, E.R. Van Sickle and Anne C. Van Sickle. The Flagstaff lode was located in 1880, surveyed in 1887, and patented in 1890 to the Flagstaff Mining Company. From 1864 to 1887, the mine was worked for gold and silver. It subsequently was owned by Massena Bullard, John Hubbard, A.K. Prescott, Frank Turner, Prescott Company and the El Dorado Mining

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[730]Roby et al., Mines and Mineral Deposits, Jefferson County, p. 45.
[731]Becraft et al., Geology and Mineral Deposits of the Jefferson City Quadrangle, p. 36.
[732]R.N. Roby, W.C. Akerman, F.B. Fulkerson, and F.A. Crowley, Mines and Mineral Deposits, Jefferson County, Montana, Montana Bureau of Mines and Geology, Bulletin 16, June 1960, pp- 50-51.
[733]Ibid, pp. 44.
[734]Mineral Survey Plats, Department of the Interior, Bureau of Land Management, Billings, Montana; Mineral Plat Books, Assessor's Office, Jefferson County Courthouse, Boulder, Montana.

Company, Frank Lamb and the El Dorado Mining Company, R.E. Toole and the Bar Ed Ranch.[735]

In 1884, the Gregory Consolidated Mining Company, (Gregory Mine) owned by W.C. Child and L.R. Nettre of Helena, built a concentrator, which could treat 30 to 60 tons of ore per day. A 550-foot-long flue joined the concentrator with the stack.[736] During these early years the mine supported the smelter and concentrator and is reported to have produced $8 million.[737] In 1886, the mine closed.

It is not clear how successful the early Gregory operation was. The mine produced $65,000 in gold and $185,000 in silver in 1882; $300,000 in gold, silver and lead in 1883; $280,000 in gold, silver, lead and copper in 1884, $300,000 in gold, silver and lead in 1885, and $517,000 in silver in 1886.[738] Buchard, in Production of Gold andSilver in the United States, 1889, claims that the Gregory Mine owned by the Gregory Consolidated Mining Company was "one of Montana's most widely known silver-lead mines, and has in the past year (1884) sustained its reputation as a heavy producer."[739] The report described it as "well equipped for the economical handling of its ore product, and new additions are being made as fast as required." However, the State Mining Inspector's Report of 1888 stated that the "Gregory Mine worked for a while, but proved a complete failure."[740] Costly hoisting machinery and a mill were constructed and the mine was not worked extensively. Like other mining operations, the funds budgeted for such operations, after early promising returns, "were soon exhausted and the end reached.[741] The mining inspector suddenly closed the mine in 1886, with several thousand dollars owing the miners. They were paid, but waited in vain for the mine to reopen.[742]

From 1889 until 1918, lessees made shipments totaling 3000 tons but these shipments included only slimes, concentrates, slag and ore sorted from the dumps. A second vein was discovered during this time, but the new ore shoots were never tapped by any of the workings of the Gregory shaft.[743]

It was generally believed after the mine's closure in 1886 that there were large blocks of ore developed below the 400 foot level, and that the mine was shut because of labor disputes rather than the lack of ore, a belief supported by Rex and Johnson's report, probably written during the 1920's. The Knickerbocker Mines Corporation was organized to work the Gregory and Bertha Mines in 1929, but no ore was produced. Since the 1920's, only small-scale leasing operations have worked the mine.[744]

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[735]Ibid.
[736]Muriel Wolle, Montana Pay Dirt, Sage Books, Denver 1963, pp. 145.
[737]Adolph Knopf, Ore Deposits in the Helena Mining Region, Montana, Department of the Interior, U.S. Geological Survey Bulletin 527, Washington: Government Printing Office, 1913, pp.17.
[738]Quoted in A.C.H. Rex and Robert Johnson, Report on the Gregory Mine, No Date, MS 37, Samuel T. Hauser papers, Box 53, Montana Historical Society.
[739]Ibid.
[740]Ibid.
[741]Ibid.
[742]Ibid.
[743]Ibid.
[744]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 50-51.

From 1941 to 1942, the American Smelting and Refining Company de-watered and sampled the mine. It did some drifting, crosscutting, and drilling, mostly at the lowest level, but found no "blocked out" ore. The mine closed in 1942. Incomplete records (All of the maps and records of these mine's operations from 1864 to 1887 were destroyed by fire) from the smelter at Wickes show that the mine produced between May 1889 and September 1890. Ore that may have been left after 1886 was probably taken out at that time.[745] Between 1917 and 1957, the Gregory is generally believed to have produced 1,381 ounces of gold, 66,655 ounces of silver, 38,470 pounds of copper, 862,370 pounds of lead, and 132,563 pounds of zinc from 18,977 tons of ore.[746]

The Gregory Mine has six levels driven from a 720-foot shaft. Three adits were driven from the shaft cellar. Drifts are at depths of 257, 339, 425, 521, 618, and 720 feet. Drifts were opened in 1941 and 1942 for a distance of 400 feet to the east and west of the shaft. Drifts beyond this point have caved in and it is not known how far they extend.[747]

Although the earliest underground developments at the Gregory Mine cannot be placed among the extant remains, the two adits with associated dumps, listed above, date at least to the 1880's.

The Banner Lode (MS #866) was surveyed in July, 1880. At this time, the survey shows only a "discovery" cut, and it is difficult to associate the development seen in 1880. The initial Banner lode discovery, was well developed by 1885, at which time it is shown on the Matchless Lode and Millsite (MS #1634), surveyed June 2-July 28, 1885. The Matchless lode of 1885 includes all or parts of the Gregory 427 and 428 lode and millsite surveys.

Another dump, called the "Lone Dump" by virtue of the fact that it is given that name in the 1930's photographs, is not associated with any now-observable adit or shaft. The third adit on the site, apparently post-dates the Belle of Belleville and the Banner, as indicated by the condition of its portal and the use of round nails there. It is not shown on the mineral surveys for the Gregory.[748]

The Alta Mine, located in the Wickes Mining District, historically has consisted of several patented mining claims located on the west and east sides of Alta Mountain. The Department of State Lands defines the Alta Mine as consisting of the Faith (MS 591), Grandfather (MS 1600A and B), Alta California (MS 741), Custer (MS 1072),

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[745]George F. Becraft, Darrell M. Pinkney, and Sam Rosenblum, Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana, U.S.G.S. Professional Paper 428, prepared on behalf of U.S. Atomic Energy Commission, Washington: U.S. Government Printing Office, 1963, pp. 71.

[746]**Roby**, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 51.

[747]Becraft, et al., Geology and Mineral Deposits of the Jefferson City Quadrangle, pp. 71; Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 50-51.

[748]Muriel Wolle, Montana Pay Dirt, Sage Books, Denver 1963, pp. 145.

Somewhere (MS 734), Keystone (MS 3634), Pandora and Clytie (MS 9981), Alta Ruby (MS 8960), and K & H (MS 7688) claims, located in Sections 9 and 10, T7N, R4W. Historically, the Alta Mine consisted of all of these claims except for the Alta Ruby and K & H claims.

The Faith claim was surveyed in 1878 and patented in 1887 to the Helena Mining and Manufacturing Company. The Grandfather Lode and Millsite were located in 1882 and 1885, respectively, surveyed in 1885, and patented to the Helena Mining and Reduction Company in 1895. The Pandora and Clytie claims were surveyed in 1917 and patented in 1918 to John Templeton. They actually constituted resurveys of older claims, including the Grandfather millsite. The K & H lode was located in 1901, surveyed in 1905 and patented in 1908 to J. Harry McCabe. The Alta Ruby claim was located in 1901, surveyed in 1909, and patented to the Delta Mining Company.[749]

The chain of ownership for the Faith and Grandfather claims is similar to that of other mines generally considered part of the Alta group. Each was patented to the Helena Mining and Reduction Company and subsequently owned by the Helena Livingston Smelting and Reduction Company, Boston, and Alta Copper Company, the Montana Silver and Lead Company (Alta Mining Company), and the Alta Mines Corporation. The Pandora and Clytie claims were sold to the Alta Mines Corporation in the early 1920s. The K & H and Alta Ruby claims were not part of the Alta group. The K & H claim was deeded to Northern Trust and McCabe to Northern Trust and Amelia Dailey. The Daileys and Northern Trust still claim title to the claim along with four other individuals. The Alta Ruby claim was owned by W. W. Dailey and is presently owned by June Hatcher.[750]

The Alta lode was discovered in 1869. In 1876, a syndicate of New York capitalists led by William W. Wickes and Charles N. Morgan, together with Cole Saunders, a mining promoter of Helena and Philipsburg, organized the Montana Company to develop the silver lodes in the Wickes District, especially those of Alta Mountain and the Comet Mine. Construction of smelting and reduction works, totaling over 30 structures of the latest design, was begun near the foot of the mountain where the town of Wickes was established in 1877. The furnaces were in partial operation by February 1877. Financial difficulties resulted in reorganization of the Montana Company as the Alta Montana Company in July, 1879. William Wickes became president and Samuel T. Hauser, who had come to control a sizeable number of bonds and who agreed to advance additional funds, was made a director.[751]

One of the claims in this area that historically have been considered part of the Alta Complex was surveyed as a claim of the Alta Montana Company between 1876 and 1882 (The Faith, 1878).[752] Other mines in the Alta Complex, outside of this area include

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[749]Mineral Survey Plats, Bureau of Land Management, Department of the Interior, Billings, Montana; Mineral Survey Plat Books, County Assessor's Office, Jefferson County Courthouse, Boulder, Montana.
[750]Ibid
[751]John W. Hakola, "Samuel T. Hauser and the Economic Development of Montana: A Can Study in Nineteenth Century Frontier Capitalism," PhD. Dissertation, Indian University, 1961, Chapter VIII.
[752]U.S. Department of the Interior, Bureau of Land Management, Billings, MT Mineral Survey Plat Records, T7N, R4W.

the Alta California (1879), the Somewhere (1879), and Custer (1882), and others further to the west such as the North Pacific, Alta Pride, the Alta King, and the Alta Bay. Most of these claims represented the earliest workings on the Alta Mountain and were located on the west side of the mountain. As of 1879, the Alta Mine consisted of 13,050 linear feet of tunnels.[753]

The Alta Montana Company spent and lost over $500,000 to develop the Alta and Comet. Lodes in the Wickes area. The mill at Wickes produced $64,113.56 in fine silver, and $325,000 in lead bullion in 1882. However, the lack of a railroad and destruction of the mill by fire forced the firm to sell its holdings to Samuel T. Hauser's Helena Mining and Reduction Company for $250,000 in 1883.[754]

The Helena Mining and Reduction Company was organized in Helena in 1883. Samuel Hauser was its president, and Anton M. Holter and Theodore Kleinschmidt were the first Montana directors. Daniel C. Corbin, from New York, also was named a director. The company had a capital stock of $3 million and moved quickly to improve the economic condition and operating capacity of the Alta Mine. In the meantime, Hauser made arrangements in Helena and New York to build a branch railroad line from Helena to Wickes. In July, he and Henry Seligman of the Seligman banking firm of New York, which owned the Gregory Mine, agreed to advance the money needed for grading a roadbed to Wickes. "The companies were to be reimbursed from deduction on freight shipments from Wickes to the main line junction."[755] The Northern Pacific Railroad agreed to these terms. The lower shipping rates enabled mining companies in the area to ship bullion to the east "for $35 per ton less than before."[756]

The Helena Mining and Reduction Company, which also owned the Comet Mine, spent $190,000 in expanding the mining facilities. The 15-stamp mill was increased to 25 stamps and two new boilers were added. The Comet concentrator was increased from 35 to 120 tons and the Alta concentrator from 150 to 270 tons. Six charcoal bins of 25,000 bushels capacity per month were constructed.[757] The company constructed a five-mile trainway from the Comet mine to the Wickes smelter. Electric lights, which were an innovation in Montana mining, were installed in the mill building at Wickes. Laying pipe and adding pumps and tanks increased the water supply.[758]

These additions and improvements increased the size and capacity of the works and reduced the cost per ton of treating the ores from 30 to 50 percent. Production in 1884-1885 was 125 tons per day. In 1884, the Corbin Concentrating Works were constructed about 1.5 miles away to treat ore from the Alta group. The concentrator cost $80,000 and had a capacity of 125 to 150 tons.[759]

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[753]Report on the Alta Montana Company's Mines and Silver Reduction Works at Wickes, Montana, New York Office, 35 Broad Street, 1879, pp. 8-1 1 5. Montana Historical Society.
[754]M.A. Leeson, History of Montana, 1739-1885, Chicago, Warner, Beers and Company, 1885, pp. 661-662; also Hakola, pp. 257-263.
[755]Hakola, "Samuel T. Hauser pp. 265.
[756]Ibid.
[757]Leeson pp. 661.
[758]Hakola, "Samuel T. Hauser pp. 266.
[759]Helena Mining and Reduction Company Reports, 1884-1885, MHS.

It was during this time that the Helena Mining and Reduction Company claimed the Grandfather Lode and one of the mining claims (MS 1600 A and B) in the study area. They were surveyed in 1885 and patented to the company in 1895. In 1886-1887 the firm enlarged its production capacity again, by adding a smelter furnace and additional concentrating machinery at the Wickes operation. In 1889, Hauser signed a contract with the Thomson-Houston Company to erect an electric generating plant at the Alta Mine. The plant generated electricity for electric lights at the Peck concentrator in Corbin, for an electric hoist at the mine, and for a tram to the concentrator.[760] 12 By then the Wickes smelter had become the largest ore reduction plant in the territory of Montana. The output of the Alta Mine was the largest in the Wickes District. By 1886, the Helena Mining and Reduction Company was employing over 450 men in its enlarged operations, which made it one of the largest mining and smelting concerns in Montana.[761]

Profits were made but did not remain large because most of them were used to purchase new equipment. Management problems also plagued the operation. Furthermore, it was an involved procedure to determine the most profitable way to refine the various kinds of lead and silver ores found in the area. Refining the ore in its final stages was more economical in the eastern and some western centers than in Montana. The Helena Mining and Reduction Company processed its own ores at first. Expansion of its works forced the company to depend more upon ores purchased from independent operations. The company often had to advance funds to mine owners so that purchase agreements could be completed. The high expenses at the Wickes plant forced the Helena Mining and Reduction Company to charge relatively high rates for smelting and reducing custom ores.[762]

The firm's production reached a peak in 1892 when it was estimated that the mine and the concentrator employed about 200 men.[763] However, the silver panic in 1893 closed the smelter that year and ores were shipped to East Helena and Butte. In 1896, the mine closed and the smelter at Wickes was moved to East Helena. The railway between Wickes and Helena was shut down in 1900. However, the population of Wickes was 1,500 until the town burned down in 1902.[764]

Production figures for the period to 1892 are generally given at 1,250,000 tons of ore at a value of $32 million in lead and silver. Hakola believes these figures are greatly exaggerated, stating that Philip K. Barbour, Hauser's nephew, estimated the total wealth produced at about $5.3 million.[765]

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[760]Alan S. Newell, "A Victim of Monopoly: Samuel T. Hauser and Hydroelectric Development on the Missouri River, 1898-1912," Master's Thesis, University of Montana, 1979, pp.35.
[761]Hakola pp. 279.
[762]Hakola, pp. 268-269.
[763]James MacKnight, The Mines of Montana, Helena, Montana: C. K. Welles Company Printing 1892, p. 50.
[764]Muriel Wolle, Montana Pay Dirt. Denver: Sage Books, 1963, p. 144.
[765]Hakola, p. 257.

After 1896, operations ceased except for intermittent lessee work. After the mine was closed, the company installed the Peck Concentrator at Corbin, which was operated for several years retreating old tailings from the old mill.

The Boston and Alta Mining Company, Inc. of Virginia acquired the Alta Mine in 1909.[766] Their company sunk a shaft near the portal of Tunnel No. 8 (The Dick Shaft), to a depth of 665 vertical feet, reaching the 1300-foot level. The company planned to mine low-grade ore believed to still be in the mine, but work stopped in 1910.[767] Lessees worked the surface to obtain carbonate ore and dug tunnels near the summit of Alta Mountain in 1911.[768]

The Boston and Alta Copper Company was succeeded in 1917 by Montana Silver Lead Company, whose name was changed to Alta Montana Mining Company. The latter company sunk a external shaft and tunneled under the old workings. These operations cost $110,000 by 1919. However, no ore was produced. The Alta Consolidated Mining Company obtained an option on the mine in 1920 and the Alta Corbin Mine Company secured one in 1923. However, neither company did much work.[769] John L. Templeton patented the Clytie (MS 9981) and the Pandora (MS 9981) claims in 1918. Both were later sold to the Alta Mines Corporation.[770] The Alta Mines Corporation incorporated May 9, 1924 in Montana and purchased the assets of Alta Montana Mining Company and Alta Corbin Mines Company (The latter was the owning company and the later a recent lessee).[771]

A concentrator, (the Hewitt mill), was erected about a mile east of Corbin in 1925 to re-treat the Alta tailings. It treated about 100,000 tons of old tailings. The Knickerbocker Mines Company bought the nearby Bertha property in 1925 and acquired a lease on the Alta property. The lease included the Hewitt mill. The company intended to operate the Alta property through the Bertha shaft, but did not do so The Hewitt mill treated 146,000 tons of Alta tailings between 1938 and 1941.[772]

In 1949 mill tailings were trucked to the American Smelting and Refining Co. smelter at East Helena. Ed Lahey of Butte secured a lease on the property, commenced where he cut the vein on the crest of Alta Mountain. He shipped the ore to the Helena smelter.[773]

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[766]Walter Harvey Reed, The Mines Handbook, International Edition. New York: W. H. Weed Publishers, 1918, p. 1027.
[767]R. N. Roby, W. C. Akerman, F. B. Fulkerson, and F. A. Crawley, Mines and Mineral Deposits, Jefferson County. Montana, Montana Bureau of Mines and Geology Bulletin 16, June, 1960, p. 46; George F. Becraft, Darrell M. Pinkney, and Sam Rosenblum, Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana, U. S. Geological Survey Professional Paper 428, prepared on behalf of U. S. Atomic Energy Commission, Washington, DC, U. S. Government Printing Office, 1963, p. 70.
[768]Adophy Knopf, Ore Deposits of the Helena Mining Region, Montana, Department of the Interior, U.S. Geological Survey, Washington, D.C.: Government Printing Office, 1913, pp. 109.
[769]Lenox Rand and Edward Sturgis, The Mines Handbook, Suffern, New York: Mines Information Bureau, 1931, pp. 1262-1263.
[770]Assessors Office, Jefferson County Courthouse, Boulder, Montana.
[771]Rand and Sturgis, Mines Handbook, pp. 1262.
[772]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 46.
[773]Ibid.

Alta mine production between 1902 and 1957 was 349,839 tons of ore. This yielded 8,174 ounces gold, 1,165,299 ounces silver, 546,286 pounds copper, 8,134,488 pounds lead, and 1,234,644 pounds of zinc. Most of the zinc was produced after 1951.[774]

As of 1960, the mine had been developed through a vertical range of 1,200 feet. There were 8 adit levels and 5 shaft levels, and about 4 miles of drifts and cross cuts. The main No. 8 adit is about 800 feet below the top of the mountain and is 4,900 feet long. It is at 5,254 feet altitude. "Levels 10, 11, and 12 were driven from an inclined wind below the No. 8 adit. Level 13 was driven from the bottom of a 665-foot vertical shaft at the portal of the No. 8 adit"[775]

According to Mead Blake, son-in-law of Ed Lahey who leased the Alta claims from the Alta Mines Corporation in the 1950's, the No. 8 tunnel was the main haulage level.[776] Blake also states that Feature 8 is the main Alta shaft joining Level 8 with lower levels of the mine. It also may be the Dick Shaft sunk by the Boston and Alta Mining Company in 1909. It is now filled with water. It is not clear which mining claim the tunnel or shaft are located on. The mineral survey of the Faith Lode of 1878 shows a tunnel at its southwest end, with a gulch running in an east-west direction across its northeast tip. A profile of the Alta Hill of 1879 shows a prospecting shaft from which a drift was being dug on the Faith mine.[777]

A 1905 survey of the K & H lode to the south and east of the Grandfather lode shows a frame stable at the southwest tip of the Granfather lode. The 1917 resurvey of the Grandfather lode (the Pandora claim) and of the Clytie claim to the west of the Pandora lode shows three tunnels on the Pandora claim and a discovery shaft near the east end of the Clytie lode. The tunnels and shafts shown on these plats do not seem to correspond to the present placement of the No. 8 tunnel and the Alta shaft.

However, Mead Blake states that there was a boarding house on the site, which he tore down when he and his father-in-law, Edward Lahey, were working the mine in the late 1950's and 1960's. Blake states that the boarding house was about 200 to 300 yards east of the hoist house and Tunnel No. 8, which would put most of the present structures on the Pandora and Clytie claims.

The history of the Washington Mine site is actually the history of three mine groups, the Elkador group, the Blizzard group, and the Mount Washington group. The Department of State Lands defines the Mount Washington mine as consisting of the Mount Washington, Placer, Deer, Deer Lode, Houghton lodes, the Little Nancy, Little Nancy Extension, and Elkador Extension, Blizzard, and Blizzard #2 claims. The Mount Washington group is historically defined as consisting of the Placer, Mount Washington, Monongahela, Keystone, Iron Mask, Homestake, and Handy Andy claims.

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[774]Ibid.
[775]Ibid.
[776]Telephone interview with Mead Blake, Corbin, Montana, November 22,,_24, and 28, 1981.
[777]Reports of the Alta Montana Company Mines and Silver Reduction Works at Wickes, Montana, by Ernest Grener and George B. Foote. New York, 1879, Montana Historical Society.

The Blizzard group is historically defined as the Blizzard, Blizzard No. 2, Deer, Deer Extension, Wickes, and Houghton claims. The Elkador is historically defined as consisting of the Elkador, Elkador Extension, Little Nancy, and Little Nancy Extension claims.[778]

The Elkador lode was located in 1882 and surveyed in 1887. Improvements as of 1887 consisted of a discovery shaft, two tunnels, shaft and drifts valued at $3,756. The Elkador Extension, Nancy, and Nancy Extension, patented in 1911 along with the Elkador Lode, became known as the Elkador Group.[779] The Elkador group made up 4 of 57 mining claims owned by the Corbin Copper Company (the so-called Corbin group), that were located at the head of Clancy Creek.[780]

The little available material on the Elkador group is contradictory. Montana Bureau of Mines and Geology Bulletin 16 (1960) states that "early work at the property was done through a 160-foot shaft" and that "high-grade silver ore was mined from the vein in the oxidized zone."[781] It appears that little early work was done on the Elkador Extension claim, which had only two discovery cuts when it was surveyed (1909). It is unlikely that any of the features located at the mine site are part of the Elkador operation.

Later, a 900-foot adit-drift was driven and about 50 tons of copper was mined from it. Three years production between 1941 and 1949 (shown in the Galconda District) amounted to 39 tons of ore, which yielded 4 ounces of gold, 611 ounces of silver, 2,506 pounds of copper, and 320 pounds of lead.[782] As of 1963, the Elkador mine was described as consisting of a "340-foot-long cross cut and a raise on the vein to the surface".[783] The drift was caved "700 feet from the crosscut and its full extent is not known."[784] Leroy Barr of Butte, Montana explored a second vein in the Elkador group in the late 1950's.[785]

The Blizzard claim was the first claim of the Blizzard group to be located (1887), surveyed (1898), and patented (1889). It was patented to the A. M. Holter Hardware Company, deeded to the Blizzard Mining Company (1910), and Clarence Renouard (1929). The claims closest to the survey area, the Deer and Deer Extension, were located in 1909 (amended location), and 1907, respectively. They were surveyed in 1917, and patented to the Blizzard Mining Company in 1919. They were subsequently deeded to Clarence Renouard in 1930.[786]

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[778]R.N. Roby, W.C. Akerman, F.B. Fulkerson, and F.A. Crowley, Mines and Mineral Deposits, Jefferson County, Montana, Montana Bureau of Mines and Geology Bulletin 16, June 1960, pp. 49, 52.

[779]Mineral Survey Plats, Bureau of Land Management, Department of the Interior, Billings, Montana; Mineral Survey Plat Books, Assessor's Office, Jefferson County Courthouse, Boulder, Montana; George F. Becraft, Darrel M. Pinkney, and Sam Rosenblum, Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana, U.S.G.S. Professional paper 428, prepared on behalf of the U.S. Atomic Energy Commission, U.S. Government Printing Office, Washington, 1963; Montana Bureau of Mines and Geology Bulletin 16.

[780]Walter, Harvey Weed, The Mines Handbook, Vol. XIII, New York City: W.H. Weed, 1918, p. 1030.

[781]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 49, 512.

[782]Ibid.

[783]Becraft, et al., Geology and Mineral Deposits of the Jefferson City Quadrangle, pp. 70.

[784]Ibid.

[785]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 50.

[786]B.L.M. and Jefferson County Mineral Plat Records.

It is believed that the Blizzard Mine was operated "from 1888 to 1896 by a company and from 1899 to 1906 by lessees."[787] The earliest workings were through shafts which are now caved in.[788] The old workings were reported to have produced about $150,000.[789] The plat of the Deer Lode claim (1917) shows a tunnel (Tunnel No. 2) running from the Deer Lode, southwest through the Wickes claim. This appears to be the Deer Tunnel crosscut of the Mount Washington mine, which extended southwestward for 1900 feet to join the 800 level of the Mount Washington Mine to gain access to that mine (Feature 8).[790] No other tunnels are shown on the 1917 plat of the Deer claims.

Little is known about the operations of the mine when it was owned by the Blizzard Mining Company except that some agreement was made in the early 1920's with the owners of the Washington Mine to enable the latter group to build a mill for their operations on the Deer Lode and Deer Lode Extension claims. Part of the site apparently was built on the Placer 4154 claim, which the Angelica Mining Company purchased.[791]

Between 1909 and 1949, the Blizzard Mine produced about 2,751 tons of ore. This ore yielded 315 ounces of gold, 19,657 ounces of silver, 133,581 pounds of lead, and 21,000 pounds of copper, and 25,205 pounds of zinc.[792]

The Placer claim (MS 4154) was the first of the Mount Washington group to be located (1892), surveyed (1893), and patented (1893). It was patented to Jacob Bean and Edward L. Hersey in 1893 and deeded to Annice Briscoe in 1903. The Mount Washington, Monogahila, Keystone, Iron Mask, Homestake, and Handy Andy claims were located in 1909, surveyed in 1915, and patented in 1916 to Fred Kauf, Jr. The Placer claim and other claims in the Mount Washington mine were subsequently owned by the Angelica Mining Company (1926), C. M. d'Autremont and James A. Walsh (1937), North Range Mining Company and James A. Walsh, Edith Archibald, and R. T. Nagle (1944) and the L H & L Mining Company of Grand Junction, Colorado, and Raymond Nagle (1957).[793]

The Washington group became one of the most significant producers of ore in the Wickes District after 1910, and operated consistently until 1960.[794] The Guggenheim Mining and Development Company of Duluth, Minnesota, owned and operated the mine from 1915 to 1919. Plans were made during that time to build a mill, but were postponed. During that time the ore was shipped to smelters, but its low grade resulted in losses.[795]

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[787]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 49.
[788]Ibid.
[789]Adolph Knopf, Ore Deposits of the Greater Helena Mining Region, Montana, Department of the Interior, U.S. Geological Survey Bulletin 527, Washington: Government Printing Office, 1913, pp. 111
[790]Becraft, et al., Geology and Mineral Deposits of the Jefferson City Quadranglel pp. 75.
[791]Telephone interviews with Allen LeMieux, Boulder, Montana, November 20, 1981, and James Archibald, Butte, Montana, November 22 and 23, 1981.
[792]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 49.
[793]B.L.M. and Jefferson County Mineral Plat Records.
[794]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, pp. 52.
[795]J.T. Pardee and F.C. Schrader, Metalliferous Deposits of the Greater Helena Mining Region, Montana, U.S. Department of the Interior, U.S.G.S. Bulletin 842, Washington: U.S. Goverment Printing Office, 1933, pp. 236.

It appears that by 1920, the tunnel joining the Mount Washington and Blizzard mines was completed. It was 1,984 feet long and ran from the Mount Washington claim at the 8th level to the portal of the tunnel on the Deer claim which crosscut the Blizzard vein. In the early 1920's, the Angelica Mining Company (incorporated in 1915) of Wickes, Montana, leased the Mount Washington mine (which in turn purchased part of the Placer claim and leased part of the Blizzard mine properties) and built a small mill and other structures at the present site in 1922.[796] In 1922, the mill treated 5,760 tons of ore that yielded $35,000 worth of concentrates. The mill was destroyed in 1923.[797]

By the 1920's, the Mount Washington workings included drifts at 11 different levels, which extended more than 12,000 feet in length. The main entry was a crosscut tunnel 2,000 feet long. Mining equipment at the Washington Mine included shops, trams, an electric power and light plant and an air compressor of 4,360 cubic feet capacity.[798] 21 The mine was operated until 1926 by the Angelica Mining Company (later purchased by the Anaconda Mining Company) when it was leased to the Elm Orlu Mining Company of Butte (operated by W. A. Clark of Butte). The Elm Orlu Company operated the mine in 1926 and 1927 and the ore was treated in the Timber Butte mill of Butte. Production was reported at $400,000.[799]

The Angelica Mining Company owned the Mount Washington Mine until 1937. During the late 1920's, the mine was operated by Warner Nikolla, a lessee. As of 1928, 20 men were employed and 120 tons of ore was produced a month. The total production of the mine to the end of 1928 was estimated at 1.1 million dollars.[800]

It is not clear when the present mill was constructed. Becraft, Pinkney, and Rosenblum state in the U.S.G.S Professional paper #428 (1963) that the United Gold Mines built a 150 ton mill and treated 1400 tons of ore between January and May, 1936. James K. Archibald of Butte, whose father, John C. Archibald, owned the mine in the 1940's, stated that the North Range Mining Company of Michigan (the Monongahela Mount Washington Company) built the mill about 1942 after the United States' entry into World War 11.[801]

The greatest period of production occurred between 1942 and 1945, when the mine was operated by the Monongahel a -Mount Washington Company. During that time, 91,300 tons of ore was concentrated in the company's 150-ton mill. The mine was closed in 1945 and the mill equipment was sold.[802]

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[796]Ibid.; Telephone interviews with Allen LeMieux, Boulder, Montana, November 20, 1981; and James Archibald, Butte, Montana, November 22 and 23, 1981.
[797]Pardee and Schrader, Metalliferous Deposits of the Greater Helena Mining Region, pp. 236.
[798]Ibid.; Weed, Mines Handbook, pp. 1026.
[799]Pardee and Schrader, Metalliferous Deposits of the Greater Helena Mining Region, pp. 236.
[800]Ibid.
[801]Telephone interview, James Archibald, Butte, Montana, November 22 and 23, 1981.
[802]Roby, et al., Mines-and Mineral Deposits, Jefferson County, Montana, pp. 52.

From 1902 through 1951, the Mount Washington produced a total of 182,001 tons of ore which yielded 11,651 ounces of gold; 1,344,082 ounces of silver; 543,770 pounds of Cooper; 14,509,148 pounds of lead; and 8,044,639 pounds of zinc.[803]

The Bluebird mine consists of the Bluebird (MS 3203), Bluebell (MS 8943), Escanaba (MS 8943), Evening Star (MS 5880), and Blackbird (MS 8942) claims located in section 13, UN, R5W. The area surveyed included about 20 acres from portion of the Bluebird, Bluebell and Evening Star claims where the three claims join and overlap.

The Bluebird mine is generally regarded as one of the oldest in the district and was a fairly consistent producer after many of the earlier and larger operations had reached their peak and had declined. The Bluebird and Evening Star claims were located in 1886. The Bluebird was surveyed in 1890 and patented in 1891 to Arabella Maulshagen, Kate Maulshagen and Michael H. Keepe. The Evening Star's location was amended in 1900 when it was surveyed. It was patented in 1902 to David Matthews. The Bluebird Claim was relocated and surveyed in 1909 and patented in 1912 to the Michigan and Montana Development Company. The Bluebird and Evening Star claims were deeded to the Michigan and Montana Development Company in 1909. These three claims were subsequently deeded, together with the Blackbird and Escanaba claims, to the Bluebird Corbin Gold, Silver and Copper Mining Company in about 1912 and the Bell family in 1930. The Bluebird Mine group has remained in the hands of the Bell family since 1930.[804]

The Maulshagens operated the Bluebird claims in the 1880's and early 1890's. It is the claim with the most shafts and most extensive tunnels and crosscuts in the Bluebird group.[805] When the Bluebird claim was surveyed in 1890, there was a shafthouse and hoist located at the west end of the claim. Two shafts were located at the central part of the claim and a tunnel was located at the northeast corner of the claim running in an east-west direction. None of these structures remain. Low-grade surface ores were mined and sent to the smelter at Wickes owned by the Helena-Livingston Smelting and Reduction Company.[806] It is reported that 1,000 tons of ore were mined between 1887 and 1893 that averaged 0.56 ounces of gold and 65 ounces of silver per ton.[807] The operation apparently was not a major one until the Michigan Montana Company purchased the mine in 1909, which also purchased the Evening Star and Pen Yan claims.

By 1911, the mine had a 1000-foot vertical shaft, 4,146 feet of drifts, and a 2,320-foot adit. The main level of the mine was a 2,000 foot adit at the 7,200 feet elevation. It is estimated that the mine totaled more than 5,000 feet of drifts and crosscuts.[808] Wallace

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[803]Ibid.

[804]Mineral Survey Plats, Bureau of Land Management, Department of the Interior, Billings, Montana; Mineral Survey Plat Books, County Assessor's Office, Jefferson County Courthouse, Boulder, Montana.

[805]Telephone interviews with Wallace A. Bell, present owner of Bluebird Mine, Jefferson City, Montana, November 24, 27, and 28.

[806]Ibid.

[807]A.N. and W.V. Winchell, Notes on the Bluebird Mine, U.S. Bureau of Mines, Economic Geology, Vol. 7, 1912. pp. 287-294.

[808]R.N. Roby, W.C. Akerman, F.B. Fulkerson and F.A. Crowley, Mines and Mineral Deposits, Jefferson County, Montana, Montana Bureau of Mines and Geology Bulletin No. 16, June 1960, p. 49.

Bell, present owner of the Bluebird Mine, believes that Feature 8 is shaft no. 2. Feature 7, is an adit to the main tunnel at level 6 (which extends to the Pen Yan Mine).[809]

Bell states that the structures now located on the Bluebird Mine were built sometime between 1909 and 1915 when the Michigan and Montana Company and the Bluebell Corbin Gold, Silver and Copper Mining Company of Helena owned and operated the mine.[810]

The ore was taken out by square-set stoping and the use of barmounted drilling machines operated by the compressor. Direct electric current line extended into the wing off of the main tunnel. *The ores were sent to various places for smelting. Early surface ores were sent by horse-drawn wagon to the smelter at Wickes, owned by the Helena Livingston Smelting and Reduction Company. The Michigan and Montana Company sent its ore to the Pittsmont smelter and the Washoe sampler in Butte and the Anaconda smelter in East Helena. It was shipped by wagons to Wickes and then by rail to Butte and Helena. Later, P. A. Bell and members of his family, or those who operated the mine under lease from them, sent the ore to the Washoe sampler and Anaconda smelter.[811]

Production at the Bluebird Mine over the years has been significant. It operated intermittently from the 1880's to the mid-1940's. The mine operated every year from 1907 to 1921 except for 1909, 1915, and 1920. Known production as of 1913 totaled at least $175,000, but amounts taken out by lessees during the same time is believed to have been an additional $75,000.[812] It is believed that about 60 to 70 men operated the mine when it was owned and operated by the Michigan and Montana Development Company.

The mine had a total of 28 producing years between 1902 and 1946. During that time it produced 3,454 ounces of gold, 33,393 ounces of silver, 960,259 pounds of copper and 203,949 pounds of lead.[813] Wallace Bell maintains that production was fairly steady until the middle 1940's when the mine operation shut down. About 15 men worked the mine in the 1940's. It has not been reopened since that time.[814]

The Bertha lode was located in 1885, surveyed in 1905, and patented in 1906 to Charles Mueller. It was deeded to the Boston and Corbin Silver and Copper Company in 1907. The Daphne claim was surveyed in 1879 and patented in 1881 to Thomas Lowrey, William Chumasero, and Amos Moulton and deeded to the Boston and Corbin Silver and Copper Company. The Daphne No. 2 was located in 1906, surveyed in 1907, and patented in 1908 to the Boston & Corbin CSM Company. The Corbin and D.E. claims were located in 1906, surveyed in 1907 and patented to the Boston Corbin CSM

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[809]Telephone interview with Wallace Bell, Jefferson City, Montana, November 24 and 27, 1981.
[810]Ibid.
[811]Ibid.
[812]Adolph Knopf, Ore Deposits of the Helena Mining Region, Montana, U.S. Department of the Interior, U.S.G.S. Bulletin 527, Washington: Government Printing Office, 1913, pp. 111.
[813]Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, p. 49.
[814]Telephone interview with Wallace Bell, Jefferson City, Montana.

Company in 1908. Jackrabbit was located in 1907, surveyed in 1907 and patented to the Boston and Corbin CSM Company in 1908. The Euberta Claim was surveyed in 1907 and patented in 1908 to the Chicago and Alta Extesion Mining Company. The Badger claim was surveyed in 1909 and patented in 1910 to the New Boston Mining Company. The Surprise was surveyed in 1907 and patented in 1907 to the Chicago and Alta Extension and Mining Company.[815]

The Bertha claim was located in 1885, but the Boston and Corbin Mining Company did not start active development of this and some of the other mines in the group until 1906-1907. Two adits were driven and a 900-foot shaft was sunk. There are about 14,000 feet of drifts and cross cuts within a vertical range of 1300 feet. The top of the shaft is at an altitude of 4,675 feet.[816] A mill was operated at the mine during its main period of activity, which was from 1907 to about 1918.[817]

In 1913, the Boston and Corbin Company of Boston was incorporated to take over the property of the Boston and Corbin Copper and Silver Mining Company. A 200-ton concentrator was constructed that year at a cost of $125,000. However, operations of the mine and mill were suspended in November 1913, because of the low grade of ore.[818] According to the Mines Handbook, the mine did not warrant construction of the mill, "but directors acted on advice of their engineers and managers." As a result, only half of the copper values were extracted. The company made tests with the flotation process in 1916. In August it began operating a 100-ton flotation unit to supplement the 200-ton gravity concentrator.[819]

The Boston and Corbin Company made an agreement with the Chicago and Alta Extension Mining Company by which the latter company developed the vein in the Corbin claim. The Chicago and Alta Company patented the Euberta, Fairview and Surprise claims and worked these claims through the Boston and Corbin shaft which crosscut the entire claim. The ore was milled at the Boston and Corbin Concentrator and flotation plant under contract.[820] As of 1918, mine equipment included an electric hoist and a 15-drill Ingersoll-Rand air compressor. There were 19 structures at the Bertha Mine, "including a boiler house, engine house, compressor house, boarding house, changing house, warehouse, office, laboratory, smithy and dwellings."[821]

In about 1917, a fire destroyed the 200-ton concentrator and The Boston and Corbin Company closed the mine. In 1929, the Knickerbocker Corporation purchased the Bertha Mine and obtained a lease on the Alta property with the intention of driving a

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[815]U.S. Department of the Interior, Bureau of Land Management, Mineral Survey Plat files, BLM, Billings, Montana, Clerk and Recorders Office, Jefferson County Courthouse, Boulder, Montana.
[816]R.N. Roby, W.C. Akerman, F.B. Fulkerson, and F.A. Crowley, Mines and Mineral Deposits, Jefferson County, Montana, Montana Bureau of Mines and Geology, Bulletin 16, June 1960, pp. 47.
[817]George F. Becraft, Darrel M. Pinckney and Sam Rosenblum, Geology and Mineral Deposits of the Jefferson City Quadrangle, Jefferson and Lewis and Clark Counties, Montana, U.S.G.S. Professional Paper 428, prepared on behalf of U.S. Atomic Energy Commission, Washington: U.S. Government Printing Office, 1963, pp. 78.
[818]Walter Harvey Weed, The Mines Handbook, Vol. XIII, New York: W.H. Weed, 1918, p. 1028.
[819]Ibid.
[820]Ibid, pp.1029.
[821]Ibid.

drift from the 1200-foot level of the Bertha Mine to intersect the Alta. However, this was not done. Glen Ore Mines, Inc., acquired the Bertha mine in 1949.[822]

The Bertha and Corbin mines produced 90,660 tons of ore which yielded 279 ounces of gold, 162,043 ounces of silver, 2,423,143 pounds of copper, and 26,730 pounds of leads. The mine produced every year from 1906 to 1918, except for 1910.[823]

It is not possible to positively correlate the existing adit (Feature 5), to those shown on the mineral survey plats of the survey area. The site appears to be located on the Bertha claim and the adit is probably to Tunnel No. 2 on the Mineral survey Plat of the Bertha claim. The plat for the Bertha claim was surveyed in 1905 and so does not show the mill, which was, built after 1907. The plat of the Bertha and other claims in the area do not show any structures in the area.

White Hall District Mining 1890-1943
By: GCM

Period 1, 1890-1909

One of the districts to be discovered during the lode mining and silver boom period was the Whitehall. In April of 1890 Anthony A. Hedley staked the first claims in the Whitehall District, followed two months later by geologists for the American Development and Mining Company. The American Development and Mining Company claims, located on Mineral Hill, lay to the north of Hedley's properties. This activity led others to prospect the area and claiming activity continued until at least 1894. This initial period was not a boom in the traditional sense, but more a boomlet or paced boom. The mining in the Whitehall district is almost exclusively hardrock. Roby et al., (1960:96) shows only 293 ounces of gold and 30 ounces of silver produced from placer operations between 1902 and 1957, with production fairly sporadic. In contrast, the lode mines produced 71,850 ounces of gold and 176,772 ounces of silver in the same period.

Most of the heavy developmental activity centered on a group of claims that came to be known as the Golden Sunlight group.[824] These included the Golden Sunlight, Blue Moose, Mineral Hill, Moonlight, Buffalo, Telluride, and Excelsior mines,[825] all located in a small area on the southeast slope of Bull Mountain. Throughout the history of the district this group of claims has been the premiere producer and, in fact, has consistently shipped as much as 80-90% of the ore from the district. Figure 6 shows the recorded ore production from the district with that of the Golden Sunlight group superimposed. It demonstrates the importance of this set of claims to the Whitehall

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[822]R. N. Roby, et al., Mines and Mineral Deposits, Jefferson County, Montana, p. 47.
[823]Ibid.
[824]Rambosek, A. F., 1946. Geology and Ore Deposits of the Golden Sunlight Mine and Vicinity. Thesis, Montana School of Mines, Butte., p. 4.
[825]Roby, R. N., W.C. Ackerman, F.B. Fulkerson, and F.A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels) Jefferson County, Montana. State of Montana Bureau of Mines and Geology Bulletin 16 Montana School of Mines, Butte, p. 115.

district as a whole. This group is presently the only producing area in the district and is largely covered by the present Golden Sunlight Mine.

The proximity of the Whitehall District to the town of Whitehall on the Northern Pacific Railroad (also later the Milwaukee Road) led to the development of a somewhat different pattern than other Montana mining districts of earlier years had experienced. In particular, the close proximity of the town and railroad appear, even during the early years, to have discouraged the growth of a substantial, permanent settlement at the mines.

Instead, miners either lived in Whitehall or in small groups, in cabins or temporary shelters at the mines. In either case, they depended on Whitehall for supplies, communication with the rest of the nation, social activities and other necessities. As new forms of transportation became available during the twentieth century this pattern of "commuting" became more pronounced.[826]
Mining exploratory and promotional activity in the District continued at what would prove to be a comparatively high level into the early twentieth century. During the 1890s a stamp mill was built by the operators of the Golden Sunlight claims, though it was soon dismantled and milling curtailed. Nonetheless, by 1904 sufficient production had been recorded to interest Eugene Ring, of Butte, in-the property. Ring organized a group of financiers from Chicago and New York and in April bought the property.[827] Ring and his associates decided to build a small (40 ton capacity) cyanide mill at the property and in 1906 reported mill runs of $14 a ton on new ore and $7 a ton on ores from old tailings.[828]

The American Exploration and Mining Company estimated that production from the Golden sunlight group between 1890 and 1910 totaled an estimated 75,000 tons of ore with gross value of gold and silver of $1.5 million.[829] The Golden Sunlight claims, the District's premier producers for the entire life of the District, were sold again in 1910 to H.C. Bacorn. Bacorn launched a development program at the mine indicating that the easily worked deposits had been nearly exhausted in the mines.[830] The same situation was reflected throughout the District. By the end of the decade (1910) production had fallen off considerably and the Whitehall District's first boom period ended. The Golden Sunlight group produced only 5,000 tons of ore worth approximately $200,000 between 1910 and 1917.[831] This ended Period I of the Whitehall District's history, which had begun around 1890.

Period 2, 1910-1928

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[826]Huckaba, Ralph, 1993. Personal Communication with Monique Kimball, December 30.
[827]Mining and Scientific Press April 1904:235.
[828]Mining World 31 March 1906:424.
[829]Roby, 1960.
[830]Rambosek, A. F., 1946. Geology and Ore Deposits of the Golden Sunlight Mine and Vicinity. Thesis, Montana School of Mines, Butte., p. 4.
[831]Roby et al., 1960:115.

The Whitehall District went into a period of subsistence level production between about 1910 and 1929 and lessors operated many of the properties.[832] It is unclear as to the type of leases being used, but commonly mines leases were split check leases in which the claim owner provided access and possibly other essential items and the leaseholders provided labor and expendable materials. This pattern continued to keep the District open, but at a relatively low level of activity until the Great Depression that began with the Wall Street Crash of 1929.

Period 3, 1929-1950

The stock market crash of 1929 marks the beginning of the third period in the history of the Whitehall Mining District. This period ended in 1950, 'well after the end of World War II. During the third period the District witnessed a much higher level of ore production than at any previous time and again it was the Golden Sunlight group that led production and activity. Part of the District's increased production also can be attributed to 1935 legislation that raised the base price of gold from $20 an ounce to $35 an ounce. After 1935 the Federal government played a more active part in stimulating production in the Whitehall District. Another example comes a few years later during World War IL The mineralization of the Whitehall District ores, especially the manganese, lead, and zinc meant that during World War II, when President Roosevelt ordered the closure of all gold and silver mines, many Whitehall mines were exempted because the mines produced strategic minerals as well as gold. Some of the mines even received subsidies from the government to produce the strategic metal ores.

Also, during the Depression and World War II another pattern, the District as a commuter industry, became more pronounced. For example, Ralph Huckaba, long-time resident and miner in Whitehall noted that during the 1930s nearly everyone working in the District lived in Whitehall and drove the seven miles to the mines every day.[833] This is reflected in the archaeological record through a lack of identifiable living areas and the near absence of domestic trash on a large percentage of the mines. Also, the mines primarily continued to be operated by lessees rather than employees.[834]

The history of the Whitehall District, as reviewed in the previous paragraphs, indicates a story typical of many smaller mining districts in Montana and the West. The mines, while owned by outside investors, never reached bonanza levels in their production. Rather, the operations continued to operate at subsistence levels for many years with occasional periods of greater production. The lack of a bonanza period is also evident by the infrequent notices regarding the District in mining publications. On the other hand, some elements of the District's past are atypical. In particular the commuter nature of many of the operations throughout most of the District's history is markedly different than other mining areas. In sum, the Whitehall District was both consistent

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[832]Rambosek 1946:4.
[833]Huckaba 1993:Personal Communication.
[834]Lindquist, Lester,. 1993. Personal Communication with Monique Kimball, December 30.

with and different from typical Montana and Western mining patterns during the late nineteenth and early twentieth centuries.

HISTORIC ELKHORN AREA
By: GCM

Bonanza Years

The history of the Elkhorn mining district began in the spring of 1868 when three prospectors William Hahn, Peter Wys, and Herman Koch came to Elkhorn Creek. Wys camped at the base of Elkhorn Peak, and, after discovering some promising samples, decided to stay. After two years of unsuccessful prospecting, he was joined by a man named Simmons. In 1872 Wys died suddenly. Although the story has not been proven, it was believed his partner murdered him. At that time there were only two cabins in the canyon; the other one was occupied by William Hahn, who remained in the cabin until at least 1897. The prospectors' first location was the Bismarck near town (named after their homeland but now known as the Moreau lode after an Elkhorn miner). Despite several other locations of promising veins, things remained quiet in the new mining camp for some time. In approximately 1879, a man named Hallbroch brought in a 5-stamp mill. The next year the Sophia lode was located, and the James R. Keene lode (24JF1298) in 188 1. More claims were filed in the 1880s, the majority located by Elkhorn resident Thomas Nicholson. During those early years, some mine owners shipped much of their ore while others waited for the arrival of the railroad to reduce the cost of shipment. By 1889 the mines were not yet great producers, and a local newspaper referred to the "insignificant camp of Elkhorn."[835]

In 1875, George Benjamin discovered the lead of the soon-to-be-famous Elkhorn mine (24JF1300). Unable to bear the heavy costs of developing the mine, he sold his interest for $200. The claim was sold again to A. M. Holter and his partners.[836]

The Elkhorn mine was officially located as the Holter lode on January 2, 1875. From then until November of 1899 it was worked almost continuously, except in 1882, when it was idle most of the year. The nationwide slump in mining due to the devaluation of silver and the financial panic of 1893 did not lead to the closing of the Elkhorn mine.[837] The mine reportedly paid $ 1,000 a day for fifteen years.

Elkhorn Townsite

As in other mining districts, the community of Elkhorn grew up around the principal mine of the district, the Holter or Elkhorn mine. Part of the town was built on the Sophia claim. Hastily constructed buildings and cabins nestle in the shadow of the remains of the Elkhorn mill. After 1890, the railroad tracks entered the valley from the

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[835]Hammond, John, 1897. "The Evolution of Elkhorn." Jefferson County Sentinel. 14 January, p. 1.
[836]Hagadone, Olive, 1985. "Evolution of Elkhorn" Boulder Monitor. June 1. 1985.
[837]Hammond, John, 1897. "The Evolution of Elkhorn." Jefferson County Sentinel. 14 January, p. 1.

south, following a hillside above town to reach the depot and then the mill just beyond it.

In 1887 the Elkhorn Mining Company applied for a patent to a placer claim covering most of the area on which the town of Elkhorn was located. The Helena land office rejected the application because it was believed that the claimants wanted to obtain title for townsite purposes rather than mining purposes on the "alleged placer ground." The townsite was not officially platted until the mid- I890s. At that point the original block and lot numbers were changed, increasing the difficulty of tracing chains of ownership in the sketchy courthouse records of those early years. By 1888, a local newspaper reported that there was hardly a spot ten feet square that had not been fenced in Elkhorn.[838] Some Elkhorn residents worked prospects and even producing mines quite close to the streets of town; for example, postmaster and merchant Charles Hopkins worked the "Townsite tunnel" on lower Main Street in 1914.[839]

Dago Town

Dago Town is a small group of buildings located in a gently sloping meadow approximately 1/4 mile north of the townsite of Elkhorn. It is assumed that the residents of Dago Town earned most of their money cutting and hauling firewood to the Elkhorn Mill. Historic photographs show large wood lots immediately south of the town, between it and the mill. This wood was hauled in on the Tramway Road until 1890. After the arrival of two carloads of coal on the first train in Elkhorn, the wood cutting industry faded away. Dago Town may well have faded with it.

Transportation

The first road to Elkhorn connected the new town with Jefferson City, 18 miles to the northwest, via Prickly Pear Creek. The original road to Boulder, used by freighters hauling ore and supplies by wagon or sled, went over the mountains west of Elkhorn via McCarthy Creek (10- 12 miles) instead of down the Elkhorn Creek valley by a longer route as it does today. This longer route was favored in the early years by farmers bringing produce to Elkhorn from the Boulder Valley. By 1886 a daily stage connected Elkhorn and Boulder; the fare in 1900 was $ 1.00. Today's road along Elkhorn Creek was built in 1888, and the railroad grade followed much of the road grade up to Queen Siding.[840]

The Northern Pacific Railroad built a branch line to Wickes in 1886 and to Boulder in 1887. The Montana Central, under construction at the same time, also passed through Boulder. The Northern Pacific built the line up Elkhorn Creek, a difficult route because of the steep grade. The grade was so steep and the curves so sharp that only short trains could be used on the line. Stations between Boulder and Elkhorn included Boulder Hot

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[838]Jefferson County Sentinel (JCS), 1887 "Situation at Elkhorn," 4 November, p. 3.
[839]Boulder Monitor (BM), 1912 "Mining News at Elkhorn," 13 April, p. 1.
[840]Crenshaw, Grace M, 1976. "The Story of Elkhorn," Boulder Monitor, 10 June..

Springs, Finn Siding, and Queen Siding, and the fare from Boulder to Elkhorn was set at $1.04. On May 19, 1890, the first train from Boulder arrived in Elkhorn on the branch line (24JF832). It provided daily or tri-weekly service for the next eight years, hauling freight (mostly ore) and passengers to Boulder and connections with the main line of the railroad. A spur line from Queen Siding to Sourdough Gulch accommodated ore shipments from the Sourdough mine. The train crew generally spent the night in an Elkhorn rooming house.[841]

By the fall of 1890, a newspaper reporter commented that "pleasure parties" and visitors were coming to Elkhorn in large numbers since the opening of the passenger line.[842]

In late 1899, when the Elkhorn mine was about to close down, train service was reduced to one train a week. The railroad was on the verge of removing the tracks, but was persuaded to keep the line going until the Elkhorn Queen a few miles to the south in Queen Gulch was prospected. This turned out to be a good decision, because the Elkhorn Queen proved to be productive and for a short time daily trains were reestablished to ship the ore from the mine.[843]

The Elkhorn Queen provided only temporary relief from the abandonment of the branch line, however. In 1899 service between Queen Siding (a couple of miles south of Elkhorn) and Elkhorn was discontinued. While train service to Elkhorn resumed, it was occasional and ceased during the winter months. The first issues of the 1902 papers noted that the branch line had finally resumed daily service.[844]

The resumption of service in 1902 can be linked to the purchase of the Elkhorn mine and mill by the Longmaid brothers. Train loads of mill equipment flowed up and down the line when the mill was retooled. In December of 1902 the Northern Pacific decided to suspend regular runs on the Elkhorn branch for the winter, and a local newspaper commented that "The grand old Elkhorn [mine] itself is asleep with one eye open." The Elkhorn mine resumed shipments on the railroad in 1906 until falling silver prices once again shut down operations. From 1905 to 1908, heavy equipment was shipped to Queen Siding to be hauled to the Sourdough mine and Rothfus mill in Greyback Gulch. The mine shipped iron ore with gold values back down the line to East Helena. The Elkhorn mine and mill resumed production in 1910 and continued to ship ore until 1912 when production from the Elkhorn ceased.[845]

In 1914, the line between Queen Siding and Elkhorn was abandoned. With the advent of the war in Europe, attention on the state of the Elkhorn branch line was diverted. During this period iron scrap drives stripped abandoned mining operations throughout the mountain west. With the abandonment of the line into Elkhorn, the mine and mill

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[841]Aspengren, Marie, 1977 "Boiler Wood, Elkhorn, 1889," Boulder Monitor, 14 July.
[842]Jefferson County Sentinel (JCS), 1890. "Elkhorn Ekoes," 18 September.
[843]Jefferson County Sentinel (JCS), 1900 "Life in Elkhorn Camp," 22 November, p. 1.
[844]Western Mining World (WMW), 1900 Vol. 12, No. 23, p. 266, June 9,1900., 1900 Vol. 12, No. 26, p. 301, June 30,1900., 1900 Vol. 13, No. 8, p. 88, August 25,1900., 1900 Vol. 13, No. 10, p. 110, September 8,1900.
[845]Quinn, Frank, 1954. "Elkhorn in Days of Silver Boom," Montana Standard 26 September.

were spared much of this salvage activity. In 1918, the rails from the Elkhorn branch were taken up from the Elkhorn mill to Queen Siding; perhaps as a result of a scrap drive. In the 1920s, much of the remaining branch line's income came from moving carload freight to the state school at Boulder.[846]

The Northern Pacific began petitioning to remove the rest of the track in 1922. Permission to abandon the railroad was granted in 193 1. Rails were taken up soon thereafter. Jefferson County purchased most of the right-of-way and the modem automobile road was constructed on portions of the railbed. A portion of the right-of-way near the mouth of Elkhorn Creek canyon was dredged in 1940. As one long-time resident of Elkhorn commented, "When the train whistle was finally stilled, the end of an era was at hand".[847]

Automobiles came slowly to Elkhorn, partly because they were expensive and partly because the road to town was seasonal and rough. In 1915, however, the local newspaper mentioned that there were quite a few cars in Elkhorn. By 1918, when the Elkhorn stage changed the service from daily to tri-weekly, the stage was no longer a wagon; it was an automobile. Horses continued to be available from the Community Livery Stable.[848]

Utilities

Water for the Elkhorn Mine and Mill and almost incidentally for the town of Elkhorn was provided by flumes. In 1887 the Elkhorn Mining Company built a nearly two-mile flume from the base of Elkhorn Peak to provide water for the mill. The flume was also used to float down wood from the higher slopes. The flume (24BF1292) that ran from "Flume Gulch" through Dagotown and on to the Elkhorn mine is shown on turn of the century maps. Water for the town was brought down from a marshy area above the Union mine into the headbox at the Elkhorn mine, then was piped to a shed next to the mine manager's house. This system worked until the 1930s, when it failed between the water tank and the shed (probably due to a frozen pipe). For a while after that, people got water by bailing it out of the Sophia shaft or by carrying it from the "spring" at the mouth of Slaughter House Gulch (the water came from an old adit under the Pittsmont dump). Between 1935 and 1937 Elkhorn Metals built a flume from the Elkhorn mine to bring water to their mill while they dewatered the Elkhorn to the 450 foot level for exploration purposes.[849]

Under an agreement with area ranchers, flumes were also used to divert water around the tailings south of town. A wooden flume that carried water away from the Elkhorn mill ran through the town of Elkhorn along the creek bed. The flow of Elkhorn Creek, of course, varied dramatically depending on the time of year; in the spring, it often ran

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[846]Crenshaw, Grace M, 1976, "A Brief History of Elkhorn," Boulder Monitor 3 June
[847]Ibid.
[848]Aspengren, Marie, n.d., "Elkhorn," Boulder Monitor, in Boulder Library Elkhorn file.
[849]Walker, David D., 1995. personal communication to Kathy McKay, July 25, 1995.

quite full due to snow melt and rain. In the 1930s a flume was constructed to bring water to town from about 1 1/2 miles up the gulch.[850]

In 1887 the Elkhorn Mining Company installed an electric light plant to illuminate its mill, hoisting works, mine stations, and office and residence of the superintendent. This was at first accomplished through steam generation, which was later supplemented by hydropower. A Pelton wheel was installed in the mill building which generated electricity from the fall of excess water in the flume. Electricity replaced gas lighting in Elkhorn's residences around 1918 via a power line from Boulder. This line was brought into the town for the East Butte mill (24JF1215), but was first used in the town when mill workers went on strike. The telegraph came to Elkhorn with the railroad in 1890. The first phone listed in Elkhorn was in 1902, but the phone line was abandoned in 1928.[851]

Mining

The fortunes and population of the mining camp of Elkhorn rose and fell with the successes and failures of the mines in the area, particularly the Elkhorn mine. When mines closed down, workers left the area in droves, but many returned when employment was again available. By 1884 there were 12 mines close to the Elkhorn that carried good values in silver. They were often developed by shafts over 20 feet deep, but the yield remained small compared to the Elkhorn Mine.[852]

After the closure of the Elkhorn Mine in late 1899, the other producing mines in the vicinity of Elkhorn continued to employ small numbers of men, and many of the workers lived in Elkhorn. Some of the mine owners, however, such as John Rothfus of the Sourdough mine, boarded men at their mine and mill sites. These men undoubtedly did much of their purchasing of supplies and spent many of their days off in Elkhorn. There were also some deposits of iron ore in the area, notably on the northwest shoulder of Elkhorn Peak and near Iron Creek, about a mile northwest of the town of Elkhorn. These mines provided a low grade of iron ores for use as flux at the East Helena smelter.[853]

To understand the Elkhorn Mining District, the source of Elkhorn's economy must be understood. The producing mines and especially the mills gave the district stability rarely found in small mining camps. Of these properties, the Elkhorn Mine and Mill for out shines all others. Even after it "closed", it continued to produce more ore than any other property. Its equipment and building materials can be seen in subsequent mining developments throughout the district. However, after the turn of the Twentieth Century, the smaller mines and mills on the periphery began to play a larger role in the

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[850]Phillips, Jane, 1982. Oral history, interviewed by Laurie Mercier, January 11. Montana Historical Society OH 224.
[851]Smith, Bud, 1995. (Elkhorn resident and grandson of John Rothfus), personal communication, 25 June.
[852]Weed, Walter Harvey and Joseph Barren, 1901. "Geology and Ore Deposits of the Elkhorn Mining District, Jefferson County, Montana." Around Annual Report of the United States Geological Survey to the Secretary of the Interior. 1900-1901. Washington, DC: Government Printing Office., p.413.
[853]Age Sentinel (AS) 1905 "News of the Mines". February 2, 1905. P. 1. 1905a 2 November, p. 1. 1906 February 15, 1906. 1908 June 25, 1908.

economy and were directly responsible for preserving the Elkhorn community until the 1930s.

Elkhorn Mine and Mill

The Elkhorn mine at one time was the largest producer in the district and one of the largest silver producers in the country. It is composed of five patented lode claims (Holter, Keene, Hardin, Silver Star and Sophia), two patented placer claims and three mill sites (Harden, Silver Star and Elkhorn). In its ultimate form the main shaft extended down to the 2,300 foot level which was 1,439 feet below the surface. Nineteen levels were driven with 12,000 feet of underground workings. The mine workings were supported by square sets and stulls. Production followed silver-bearing calcite ore shoots between a hornstone hanging wall and dolomite footwall.

The mine was located in early January of 1875 by County Commissioner Benjamin. Being strapped for cash at the time, he sold the mine for a mere $200. The mine was resold to A. M. Holter and associates who formed the Elkhorn Mining Company.[854]

The Elkhorn mine dominates the history of the district. Walter Harvey Weed (1901) in his report on the district discusses the Elkhorn mine almost exclusively.

The Elkhorn district was prospected early in the history of the State and numerous quartz locations were made in the years preceding 1870, but the district did not attract attention until the A. M. Holter lode became a producing mine. This property, later known as the Elkhorn mine, has been the principal and, in fact, almost the only producer of the district, and was for many years one of the prominent silver mines of the country. The history of the mining industry of this district is therefore the history of this mine.

The Elkhorn property was sold by its original locators to A. A Holter, after whom the claim has been named. Mr. Holter organized the Elkhorn Mining Company, and the mine has since been known as the Elkhorn mine. A 5-stamp wet crushing free-milling plant was erected by the first owners, and as the surface ores were free milling and yielded readily to simple amalgamation, satisfactory results were realized in the early history of the property. With increased depth, however, the oxidized ores became refractory and the loss in treatment became as high as 50 percent of the silver values.

In 1881 the mine was developed to a depth of 300 feet, and the nature of the ore made it evident that a new mill would have to be erected and chloridization adopted. Owing to a disagreement among the owners and the necessity of enlisting new capital, the property was idle for a greater part of the year 1882, though it yielded 4,285 ounces of fine silver during that year. In 1883 the property passed into the possession of the Elkhorn Mining Company, a new hoist was erected, and a 10 stamp-chloridizing mill

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[854]Jefferson County Sentinel (JCS), 1894 "Mines and Mining," 19 April, p. 3.

was put up, with a capacity of about I I tons per day. The ore was stamped fine, roasted, and amalgamated in combination pans without grinding. The result was a saving of 90 percent of the values and a bullion product aggregating $188,375 in silver and $2,320 in gold for the first ten months after installment. The bullion product was 900 fine in silver, with a little gold, the principal impurity being copper.

The old Elkhorn Company subsequently increased its battery to 20 and then to 25 stamps and worked the mine down to the 800 ft level, where lean ore was encountered, and some doubt was expressed whether the property was not worked out.[855]

In 1886 the mine was temporarily flooded to the 500 foot level from an accident to the pumps. The mine filled at a rate of 300 gallons a minute. The mill was idled as the mill's steam power was diverted to pumping out the mine. New, more powerful pumps were installed, but the existing steam lines proved inadequate to power the draining of the mine. When new steam lines were installed, the mill reopened while the mine was drained.[856]

In 1888 the Montana Corporation sold out to a new company organized in London, which took the name and property of the old corporation, remodeled the mill, and instituted a policy of vigorous development.

In March of 1890, the new Elkhorn Mining company began working the mine. The work proceeded under the direction of John W. Plummer, Manager and C. A. Molson Superintendent. At the time the 37-degree incline shaft was down to 1,150 feet with stations cut every 100-ft. For the first 50 feet of the shaft, under the hoisting house, the shaft was timbered with 12 x 12 square sets with strong center posts. In later years, no evidence of these square sets would remain. In other parts of the mine, stulls were used. A double decker skip was attached to a 1 1/4 inch steel rope which was wound by a Frazier and Chalmers 20 x 60 double cylinder hoist. The company employed 76 miners (only two of which were above the 600 foot level) and 24 men in the sorting house. The 25 stamp mill was used for the free ore while the lead ore was shipped directly to East Helena.[857]

At its peak, the mine's monthly payroll averaged $15,000 for the miners, mill hands and woodchoppers. The town of Elkhorn grew to 600 souls, all directly or indirectly supported by the mine.[858]

The rapid decline of silver prices following the repeal of the Sherman Silver Purchase Act in 1893 did not close the Elkhorn Mine. Although the work force was trimmed

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[855]Weed, Walter Harvey and Joseph Barren, 1901. "Geology and Ore Deposits of the Elkhorn Mining District, Jefferson County, Montana." Around Annual Report of the United States Geological Survey to the Secretary of the Interior. 1900-1901. Washington, DC: Government Printing Office.

[856]Roby, R. N., W. C. Ackerman, F. B. Fulkerson and F. A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana Bureau of Mines and Geology Bulletin 16, Montana School of Mines, Butte, Montana.

[857]Hogan, Joseph, and Jacob Oliver, 1891. Third Annual Report of the Inspector of Mines, for the Fiscal Year 1891. Helena: Journal Publishing Co.

[858]Jefferson County Sentinel (JCS), 1902. "Elkhorn Mining District," 18 December, p. 1.

down to 50 men, the mine remained active. Despite the slowdown, the mine continued to ship from six to seven bars of bullion out by rail twice a week and a carload of silver-lead ore to the smelter every other day. At a time when silver prices under $1 per ounce closed every other silver mine in the state, the Elkhorn was reported to be able to break even at ten cents per ounce. Incredibly, the mine was able to pay a dividend to its stockholder of $11,000. During the year the mine's shaft was deepened from 1,550 feet to 1,700 feet. In 1894, the mine once again employed 75 miners and 25 top men. Molson was listed as both Superintendent and Manager and William Davey as the foreman. Under their guidance the shaft was extended down to 1,975 feet. The state Mine Inspector C. S. Shoemaker reported that "Elkhorn is the deepest mine in the state and has been in active and paying operation for 15 years".[859]

In 1896 it was rumored that the mine was exhausted and the mine would be abandoned. Walter S. Kelley was made manager with William Davey as foreman. With a crew of 100 miners, a program of exploration revealed new ore bodies. These were worked from the shaft which had reached 2,300 feet, its deepest development. In 1898 employment at the mine had risen to 123 men.[860]

The Elkhorn Mining Co. continued to work the property until December 1899. In the autumn of 1899 it became apparent that the expense of pumping, which necessitated heavy fuel bills, combined with the small extent and low grade of the ore in sight, would not warrant the further operation of the mine. The cost of the ore extracted had steadily risen during the last few years until in 1898 it reached a total of $15.60 per ton, while the expense of milling increased to $9.50 per ton. It was therefore decided to close down and abandon the property.[861]

From 1884 to 1900 the mine was in continuous operation, save for the short time in 1886 when the mine was flooded. Under the management of the new Elkhorn Mining Company the mine yielded 6,500,000 ounces of silver and 5,000 ounces of gold from 1888 to 1900. Total production for the mine was reported to be 8,902,000 ounces of silver, 8,500 ounces of gold, and 4 million pounds of lead.[862]

Late in 1899 the pumps were removed and the surface machinery sold. Although the town of Elkhorn had a population of 400 and boasted two stores, the railroad announced plans to abandon their Elkhorn branch. Although the railroad ultimately did not close the line, for a time the future of Elkhorn looked extremely bleak.

J. Henry Longmaid and Company

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[859]Shoemaker, C. S., 1893. Fifth of the Inspector of Mines of the State of Montana, Intermountain Publishing Company, Butte.

[860]Shoemaker, C. S., 1896 Seventh Annual Report of the Inspector of Mines of the State of Montana, State Publishing Company, Helena.

[861]Weed, Walter Harvey and Joseph Barren, 1901. "Geology and Ore Deposits of the Elkhorn Mining District, Jefferson County, Montana." Around Annual Report of the United States Geological Survey to the Secretary of the Interior. 1900-1901. Washington, DC: Government Printing Office.

[862]Hogan, Joseph, and Jacob Oliver, 1891. Third Annual Report of the Inspector of Mines, for the Fiscal Year 1891. Helena: Journal Publishing Co.

The Jefferson County Sentinel reported on July 12, 1900 that the Elkhorn mine had been sold to J. Henry Longmaid and Associates. The price for the mine was a mere $18,000. It was presumed that the new operators would rework the old dumps. In 1901, Longmaid et al sold their mine along with the nearby Sophia claim for $25,000 to the Longmaid's newly organized Elkhorn Silver Mining Company. Longmaid began careful tests of the dumps and the portions of the mine above water level and determined that there was 200,000 tons of 4 percent lead ore with some silver and gold values. The old chloridization process was discarded in favor of a more efficient gravity separation using jigs and tables. Longmaid's Elkhorn Silver Mining Company began operations in 1901. A 12 x 14 Ledgerwood hoist was installed and mining began in the upper workings. The mill was remodeled and old dumps and mine ore were processed. In 1901 a large body of iron ore carrying silver values was found and some ore was shipped to East Helena. The mine employed 100-150 men and produced 400,000 ounces of silver and 159.5 ounces of gold. However, the continued low price of silver caused the closure of the mine, which refilled with water.[863]

In 1906 Longmaid and associates dewatered and again opened the mine. While the year long dewatering process continued, mining began work in the upper levels. The mill on the property was equipped with Frue vanners ordered from England which replaced the previously used Wifley tables. Sixty men began working the mine in 1907 and 400 feet of development work was done. Despite the railroad being temporarily closed by a washout in 1908, the mine continued operation. The mill was refitted with new, larger roasters. When the mine was inspected by a correspondent of the local newspaper, it boasted Knowles pumps, and Ingersoll-Rand air compressor and drills. The process of Longmaid's mill was described as flowing from a jaw crusher, to 20 stamps, to 12 Frue vanners and two Lurig tables. The latter being the only such tables in the country. The mill ran on two shifts running old mill dumps and second class ore from the mine. Ore was carried to the mill by conveyor belts were it was sorted for treatment. Inspection of the mine revealed a depth of 2,300 feet with a reported 15 miles of workings. Because of the stability of the rock, only stulls were used and no square sets. Great chambers 60 to 70 feet in height and 20 to 30 feet in width were found with no support whatsoever.[864]

In 1908 construction on a new mill was begun to treat the extensive mill tailings with the BakerBurwell Process. The plant, located below the town of Elkhorn, was completed in 1909 by the Elkhorn Electro Metals company. The mill tails were worked in 1922 and in 1937. In 1943 the remaining tails were shipped out of the district for use as flux.[865]

In 19 10 the Elkhorn Silver Mining Company resumed production in the mine at the 2,300 foot level. By June, the last of the mine's old ore bodies had been cleaned up. Josiah Bowden, who was in charge of the Longmaid's operation, put 100 miners on development work "one on each stringer he could find that lead into the footwall, and

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[863]Roby, R. N., W. C. Ackerman, F. B. Fulkerson and F. A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana Bureau of Mines and Geology Bulletin 16, Montana School of Mines, Butte, Montana.

[864]Montana Bureau of Mines and Geology (MBMG) nd Vertical Files. Notes on conversation with Josiah Bowden in Helena on April 24, 1940.

[865]Roby, R. N., W. C. Ackerman, F. B. Fulkerson and F. A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana Bureau of Mines and Geology Bulletin 16, Montana School of Mines, Butte, Montana.

kept the mine going on ore so developed" (MBMB vert files). Longmaid, who was spending a year in Europe, expected the mine to close, but Bowden's methods kept the mine operating for 27 months. The largest ore bodies were between the 1200 and 1600 foot level. The company installed a 140 ton mill equipped with the latest machinery including 20 stamps, 2 tables and 12 Frue vanners which saved 95 percent of the silver-lead values. While the mine employed 75 to 100 men, 200 men worked at the combined operation. In 1912 the ore was exhausted and the mill stood idle. The pumps were turned off in the mine and water allowed to rise to the 1100 foot level.[866]

The Sophia Shaft

The Elkhorn mine was sold in 1916 to Henningson, Stackpole and Walker for a reported $25,000. Initially, activity centered around shipping out tailings to the East Helena Smelter. In 1928, a subsidiary of Ardsley-Butte Mining Company of Butte took out a lease and bond on the property. Under the management of Lyman Carlston, the Sophia shaft was cleaned out, deepened and enlarged. This shaft was located 300 feet south of the Elkhorn shaft, directly below the Superintendent's Office/ Boarding House.[867]

The Sophia was located by Fred Bright on June 3, 1880, but only slightly prospected as late as 1890. When it was surveyed for patent in 1892 when it belonged to Frank P. Sterling, improvements were listed as a discovery shaft, tunnel level, two shafts and a house valued at $2095.20. Around 1901, the claim came into the hands of J. Henry Longmaid, who had recently also purchased the adjacent Elkhorn claims. He worked the two properties together under the umbrella of the Elkhorn Silver Mining Company.[868]

When surface development on the Sophia resumed in 1928 under Ardsley-Butte, the shaft was cleaned out using a small hoist exposed to the elements. When the cleanout was completed, a small wood headframe and a hoist house were installed to handle the mining tonnage. The underground development consisted of cross-cuts at the 100 foot level running east / west. Ore stringers were encountered in both cross-cuts about 75 ft from the shaft. The stringers led to a footwall chamber deposits. The west deposit was about 25 to 30 feet long, 12 feet wide and about 15 feet thick of good shipping and milling ore. The eastern deposit was also about 25 to 30 feet long, but only 7 feet wide and of lower value ore. Work commenced on the ore bodies despite dropping silver prices until the "Crash" of 1929 put a stop to mining.[869]

Although the tailings were reworked in the 1930s, no further underground work occurred until the spring of 1942 when Stuart McKee obtained a lease on the Elkhorn mine. McKee limited his activity to installing hoisting equipment on the Sophia shaft.

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[866]Stone, Ralph Walter, 1911. "Geologic Relations of Ore Deposits in the Elkhorn Mountains, Montana", U. S. Geologic Survey, Bulletin 470, pp. 75-98.

[867]Walker, David D., 1951 "The Elkhorn Mine of Jefferson County, Montana." B. S. Thesis, Montana School of Mines, Butte, Montana.

[868]Ibid.

[869]Ibid.

At the time McKee subleased the tailings to Masten Taylor who shipped 62,116 tons of tailings to the smelter in East Helena for use in balancing furnace charges.

In 1945, Mr. Wade V. Lewis of Boulder took over Mr. McKees' lease on the mine workings. Mr. Lewis pumped the Sofia shaft dry, and continued the eastern crosscut to where it intersected the workings of the big mine. He is also driving a drift on the 400 ft level toward the Keene property north of the Elkhorn mine in the hope of encountering more deposits in that locality. Also Mr. Lewis has sunk an exploratory winze about 100 feet deep on the westerly crosscut, 50 ft from the Sofia shaft.

The Lewis operation connected to the Keene shaft, but did not mine in that area. He drove some raises in the Elkhorn and did some "pillar robbing". He shipped some ore from the Sophia and shipped the last of the mill tailings from the Elkhorn Mill. By January of 1951, 6,118 tons of crude ore had been shipped to the smelter. In the summer of 1949, Lewis interested the American Smelting and Refining Company in the property, but negotiations were never completed.[870]

Mentor Exploration, a Canadian firm, obtained a lease on the property in 1954. An exploration program conducted between January and April of 1955 produced 33 drill holes in the Sophia, Elkhorn and Keene. Two holes were also drilled on the Relief. The operation ran out of money and dropped the lease. In 1966 Anker Henningsen formed the Development Operating Company (DOC). The company's operation of overseen by Robert E. Tally with Maurice J. Smith as their foreman. DOC cleared out the airshaft, pumped the mine down to the 450-foot level, rehabilitated the main shaft and drove a crosscut to intersect the Lewis winze under the Sophia. After obtaining an O. M. E. Loan, the shaft was pumped to the old pump station on the 1150-foot level. The pump station resumed its duties as the shaft was rehabilitated down to the 1050-foot level. At that level the company drove crosscuts and conducted diamond drilling. While the exploration resulted in an 0. M. E. certified discovery, the 0. M. E. refused to participate in further exploration. The pumps were then pulled. In 1986 the properties were leased through DOC to Goldfields who later turned the property to Santa Fe Gold.[871]

East Butte Mill

The East Butte mill was built from 1916 to 1921 to process the ores from the Moreau group of claims. The first mention of the Moreau lode occurred in 1888 when it was reported in the Boulder Age that it had been bonded to a party of Helena investors for an undetermined amount. In September of the next year, the mine and mill site were surveyed for patent. The owner was listed as Mark S. Moreau and improvements listed as a discovery shaft, drift, three shafts and buildings valued at $3,725.00. A map of the property shows a log cabin, a stamp building and a shaft house on the claim.[872]

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[870]Walker, David D., 1995. personal communication to Kathy McKay, July 25, 1995.
[871]Ibid.
[872]Boulder Age (BA), 1889 December 4, 1889.

In 1905, the Moreau group of claims was obtained by the Pittsburg-Montana Mining Company, which had extensive holdings in Butte. They announced plans to begin immediate activity on the mine. The local newspaper anticipated a revival of the mining community as ore trains once again ran to the town. However, little came of the transfer of ownership.[873]

In 1909, the Moreau group briefly produced ore under the name Swissmont. Messrs. Green and Erickson were reported in 1913 to be working the Silver King claim below town. This may have been the Moreau or a portion of the Moreau. The pair was said to be blasting a tunnel into their claim. In 1914, the Moreau appears to have been worked under the name of Copper King. At the northern end of the claim, Ed Guyas and his partners were taking out good iron fluxing ores with gold values. They reportedly were shipping one carload to the smelter each week by stopping and drifting on 8 feet of shipping ore. They erected a 50 ton ore bin (Feature 5a) below their workings in anticipation of doubling their output.[874]

In later years the mine became known as the Pittsmont (1914 - 1916) and then again the Swissmont (1921 - 1924). Under the later name, the mine saw its greatest production. In 1915, the East Butte Mining Company began planning a 100 ton mill to work the ore from three patented mineral claims: the Moreau, the Peacock and the Turkey. The three claims are collectively referred to as the Swissmont properties. The mill also briefly worked ores from the Hofmann group of claims to the west (Carmody mine claims).[875]

In late 1916, the East Butte mine was reported to be working 20 men and shipping a carload a day to East Helena. In early December a cave-in temporarily stopped work, but it was quickly cleared away and work resumed. At the time the work was being done with the assistance of a steam hoist and compressor. Work on the mill was progressing and materials for the concentrator and cyanide plant were on order. It was predicted that the 300 ton mill would be up and running "the first of the year".[876] As part of the development plans, the plant, hoists and drills were to be electrically powered. A power line was to be constructed from Boulder to Elkhorn. To defray costs, the power was also being made available to others in the area. A few hundred yards upstream on Slaughterhouse Gulch, the Dickman mill was already wired and awaiting electricity. Although electricity had been used in Elkhorn as early as 1890, its use was limited to the Elkhorn mill and a few other special applications.[877]

In addition to their order for materials for the construction of a concentrator and cyanide plant, the mine owners also ordered a 30-ton transformer. When the 30 ton transformer finally arrived, it took a specially constructed wagon to carry it to the n-dll. This wagon, which is still on display in Elkhorn, was drawn by 24 horses. It is unclear

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[873]Age Sentinel (AS) 1905 "News of the Mines". February 2, 1905. P. 1. 1905a 2 November, p. 1. 1906 February 15, 1906. 1908 June 25, 1908.
[874]Mining and Engineering World (M&EW) 1914 Volume 40, May 30, 1914. p. 1028. 1916 Volume 45, December 23, 1916. p. 1089.
[875]Roby, R. N., W. C. Ackerman, F. B. Fulkerson and F. A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana Bureau of Mines and Geology Bulletin 16, Montana School of Mines, Butte, Montana.
[876]Mining and Engineering World (M&EW) 1914 Volume 40, May 30, 1914. p. 1028. 1916 Volume 45, December 23, 1916. p. 1089.
[877]Ibid.

whether the transformer had to be hauled the short distance from Elkhorn or whether, because of the railroad abandonment in 1918, it had to be hauled the longer distance from Queen Siding.[878]

In January of 1917 the miners at the East Butte struck, asking for a raise from $3.50 to $4.00 per day. The mine was closed by the strike, but work continued on the mill. By March, both the mine and mill were silent. Most of the workers went to Limespur for work. While the company waited for costs to decrease, i.e. worker wages to drop, the mill stood idle. Presumably, because of this stoppage, the long-awaited powerline to Elkhorn did not arrive until 1918.[879]

Mining on the Pittsmont claims resumed in 1921 on a larger scale than before. Gold was found right up to grass roots. "Top Slicing" was employed. This method was described by Walker (1995) as a process "where timber mats were constructed above stopes and allowed to retreat downward as stopping progresses".[880]

Work also progressed to finish the mill. To handle the increased output from the mine, the mill was enlarged from 100 to 175 tons capacity. In December of 1921, the Mining and Scientific Press reported that the East Butte cyanide plant was processing 150 tons of ore per day. The ore going through the mill was said to run about $8 per ton in gold. The East Butte Copper Mining Co. operated the cyanide plant all through 1922 and 1923 on low grade ore. Although the mine was the largest producer of gold in the district, in the 27 months of operation the mine lost $24,358.89. This was primarily due to ". . . unfavorable developments on the 200 foot level, to the high cost of wages and materials, and to lower recoveries than those obtained in preliminary tests, due to changes in the character of the ore". In December of 1923, the mill and mine closed.[881]

Part of the problem with the mine is that contrary to expectations the ore pinched out at the 300 foot level. Further, the mill was not grinding the ore from the 200 foot level fine enough to liberate the minerals. When the grinding process was adjusted, it was found that the ground material packed in the cyanide tanks. Agitation tanks then had to be installed[882]

In 1938, H. B. Chessher leased rights to the old tailings of the East Butte mill to the J. L. Shiely Company of St. Paul. Water rights and use of the old mill were included in the deal. The Western Iron Works of Butte built a 100-ton cyanide mill to rework the tailings, which were reported to contain $2.40 per ton in gold.[883]

Dickman Mill

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[878]Crenshaw, Grace M, 1976, "A Brief History of Elkhorn," Boulder Monitor 3 June
[879]Ibid.
[880]Walker, David D., 1995. personal communication to Kathy McKay, July 25, 1995.

[881]Roby, R. N., W. C. Ackerman, F. B. Fulkerson and F. A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana Bureau of Mines and Geology Bulletin 16, Montana School of Mines, Butte, Montana.
[882]Walker, David D., 1995. personal communication to Kathy McKay, July 25, 1995.
[883]Mining Journal The (MJ) 1938 "Montana", Volume 22, #2, p. 30.

The Montana and Homestake claims which comprise the Heagan mine were located in 1880. The mine is situated between the Golden Curry and the Swissmont. Weed (1901) stated that the Homestake, located three-fourths of a mile northwest of Elkhorn showed ore bodies in dolomite. According to Montana Bureau of Mines records (Roby 1949), deposits are along the contact of quartz intrusive with Meagher Limestone, Wolsey Shale and Flathead Quartzite. The mine was developed by a 35 foot shaft, a lower 600 foot adit, three recent 8 to 10 foot cuts and caved short adits, pits and caved shallow shafts. After 1915, the ore was reduced in an amalgamation mill on a creek adjacent to the property. The property was ultimately composed of five patented claims.[884]

In 1906, James Heagan shipped two cars of ore from his claims opposite the ridge from the Rothfus mine. He also leased one of the claims to Messrs. Winscott and Hardie of Helena. It was last worked in 1930 by Fred Zendron of Elkhorn.[885]

In 1913, a deal was rumored involving the Heagan mine. The mine was acknowledged to be a good property with large bodies of iron ore, carrying from five to twenty dollars per ton in gold. The mine had been worked for several years and had shipped its ore at a profit. However, the Boulder Monitor editorialized that it would only realize its full value with a mill at or near the property.[886]

H. Dyckman (also spelled Dickman) and John Rothfus began working the mine in 1915. By August they had begun the installation of a 10-stamp mill that had salvaged from the Big Indian mine in the Montana City district. The 10-stamp mill had been idle since 1902 when the Big Indian mine replaced it with an electric 60 stamp mill.[887]

In April of 1916, it was reported that work was resuming at the Dickman Mill. When the nearby East Butte mill announced plans to bring electricity back to Elkhorn, Rothfus and Dickman, who were running their own mill at a profit a few hundred feet upstream from the East Butte, wired their mill to take advantage of the cheap power. A transformer was ordered and in place by October of 1916. The electricity was also to be used to power compressor and drill equipment at the nearby Dolcoath (Hard Cash) and Montana (Heagan) tunnels. All was in readiness to begin crushing ore as soon as the electricity was turned on. However, labor problems at the East Butte, delayed the powerline for two more years.[888]

In seven active years between 1906 and 1930, the mine produced 620 tons of ore. Reduced, this ore produced 191 ounces of gold, 294 ounces of silver, 241 pounds of copper and 7 10 pounds of lead. The ore was assayed to contain 11 ounces of gold, .05 ounces of silver per ton while carrying 36.5 % iron, .04% nickel and .0465 copper. Unknown parties ran the mill in 1919 reducing 28 tons. In 1949, W. B. and Grace

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[884]Boulder Age (BA), 1889 December 4, 1889.
[885]Age Sentinel (AS) 1905 "News of the Mines". February 2, 1905. P. 1. 1905a 2 November, p. 1. 1906 February 15, 1906. 1908 June 25, 1908.
[886]Boulder Monitor (BM), 1913b 13 September, p. 2.
[887]Boulder Monitor (BM), 1915b August 7, 1915, 1916b 8 April, p. 2., 1916c December 9, 1916
[888]Crenshaw, Grace M, 1976, "A Brief History of Elkhorn," Boulder Monitor 3 June

Crenshaw owned the mine with improvements listed as a 500-foot main adit and a 35-foot shaft with a headframe.[889]

The Montana, Heagan, Birds Eye, Park and Gold Hill were surveyed for patent (MS # 1069 1) in the summer of 1934. The claims were owned by Bertha W. Heagan who listed "ten shafts, nine tunnels, four cuts, one glory hole and interest in a common improvement consisting of one tunnel, one winze, and two drifts". Total value of the improvements was listed at $12,005.00. The mill is shown in the south end of the Bird's Eye claim.

In 1960 the mine was owned by the Heagan Estate and John Rothfus of Boulder. In living memory the mill has come to be known as the Heagan mill. It is noted in local histories as the place where Stuart McKerrigan died of a heart attack.[890]

HISTORICAL OUTLINE OF THE BUTTE DISTRICT
By: GCM

The history of the Butte area began in May of 1864 when two prospectors G. 0. Humphreys and William Allison, located rich placer claims in Missoula Gulch. In August of 1864, the Summit Valley Mining District was formed. Contemporary with the placer gold discoveries, veins and lodes were prospected and claims staked. Credit for the first vain location is given to Mr. William L. Farlin who located the Asteroid Claim on a large manganese stained quartz reef.[891] This claim later became the Travonia. The Parrot Lode was located in 1864.

Placer gold deposits in the Butte area were shallow and the gold was of low grade due to the fact that it contained large quantities of silver. Ore from many of the early lode mines in Butte was hauled by wagon to Fort Benton and shipped via the Missouri River east to Newark, New Jersey to be smelted. Ore was also shipped by boat to Swansea, Wales to be smelted. The first blast furnace in Butte was built in 1866 on Quartz Street.[892]

Partially due to the exhaustion of the gold placers, Butte suffered through some lean years between 1869 - 1875, losing much of her population to surrounding mining camps.

It was during this period that W. A. Clark settled in Deer Lodge and began his extensive mining investments in the Butte Mining District. In 1872, Clark purchased the Colusa claim and started development work on the Colusa, the Original, Mountain Chief and the Gambetta claims. This period marks the beginning of Butte's second major mining phase, that of the silver industry. Marcus Daly arrived in Butte in 1875 as

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[889]Roby, R. N., W. C. Ackerman, F. B. Fulkerson and F. A. Crowley, 1960. Mines and Mineral Deposits (Except Fuels), Jefferson County, Montana Bureau of Mines and Geology Bulletin 16, Montana School of Mines, Butte, Montana.
[890]Walker, David D., 1995. personal communication to Kathy McKay, July 25, 1995.

[891]Lesson, M.A., 1885. History of Montana 1739-1885. Warner, Beers & Co., Chicago.
[892]Sanders, Helen Fitsgerald, 1913. A history of Montana. New York: Lewis Publishing Company.

an agent for the Walker brothers of Salt Lake City, Utah. He recommended that the Walker brothers purchase the Alice Mine. The period from 1875 to 1881 saw the establishment of Butte as a city and as an important mining, milling and smelting center.

In December of 1881, the Utah and Northern Railroad finished its line from Salt Lake City to Butte, providing a nuch needed transporation outlet for the mining industry. The silver mills in Butte reached a pinnacle of development between 1881 and 1893. However, with the decline of silver prices in 1893, many of the large silver plants were closed down.[893] Some estimates are that as of January 1, 1897 the Butte mines had produced 500,000 ounces of gold, 100,000,000 ounces of silver and 1,600,000,000 pounds of copper.

The last phase in the development of the Butte area was the emergence of copper into a dominant position in the mining industry. Small amounts of copper were shipped from Butte in the 1870s to Swansea, Wales to be smelted and refined for there was no facility in Butte to do this. The first successful copper smelter was built in Butte in 1878.

A Michael A. Hickey discovered the Anaconda lode in 1866.[894] Daly acquired the Anaconda property in 1881 and obtained financial assistance from George Hearst of San Francisco to develop the property.

Ore from this mine treated at the Dexter Mill produced base bullion of 60% copper and 40% silver (Weed 1912). By 1892 the Anaconda Company produced 100,000,000 pounds of fine copper and became the largest single producer in the world. The Anaconda Copper Mining Company was reorganized in 1895 and the shares belonging to George Hearst were put on the open market. By 1895 Boston, which had long been the financial center of the copper industry, had a major interest in the Butte mines. In the early spring of 1897, William A. Clark filed incorporation papers and consolidated his vast interests. Two years later the Anaconda properties were all purchased by the Standard Oil Company financed by the City Bank of New York. In 1889, a figure who was to emerge rapidly on the Butte scene arrived in Butte from New York. This was Augustus Heinze, recent graduate of the Columbia School of Mines. Within a short time he pushed himself into the arena long occupied by Marcus Daly and W. A. Clark. This resulted in the so-called "War of the Copper Kings" which was to drag through political battles and court hearings for almost a decade. The fight centered on the "Apex Law" which ruled that the owner of a surface claim containing the apex of a vein could follow it underground as far as it went. Although this "Battle of the Copper Kings" retarded production, the Butte District was second only to Rand, South Africa, in the production of mineral wealth in 1906.[895]

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[893]Weed, Walter H., 1897. Geologic Atlas of United States - Butte Special Folio. United States Geological Survey, Government Printing Office, Washington, D. C.

[894]Lesson, M.A., 1885. History of Montana 1739-1885. Warner, Beers & Co., Chicago.

[895]Weed, Walter H., 1912. Geology and Ore Deposits of the Butte District, Montana. U.S. Geological Survey, Professional Paper 74, Goverment Printing Office, Washington, D. C.

During this period Butte was at the peak of a long and colorful history as a mining camp. This boisterous, coarse, smoke-enveloped city had a dynamic vitality, which made it unique. A contemporary account gives a vivid portrait of Butte in 1906:

As for suffering families, there are few here to be affected. Butte is a man's town, rude, strong and careless. Every day eight thousand men come up from underground and pour out through the streets into the saloons and lodging houses. Two thousand more come from the various surface workings. The rest of Butte's great population live from the wages of this basic class. Muckers get $3.50 per day, and every other work in ascending proportion. Men of every nation have floated to this cosmopolis; Austrians and Italians are herded in cheap tentements, Swedes and Norwegians are colonized in boarding houses, Welshmen and Cornishmen congregate clannishly, but the Irishman is generally the boss. He is a remnant of the old Marcus Daly days, big, powerful, overbearing - a driver of men. But right in his midst is growing up his master. Young men from every mining school in the land are toiling with the muckers, miners and timbermen, "getting their experience". Soon, as shift-bosses, foremen and superintendents, they will be more intelligently extracting this great amount of ore, even now aggregating 3,500 tons daily.

Because of the necessity of amusing this conglomeration, Butte is the best 'show town' of its size in the country. It patronizes them all from the high-class opera to the low-down music hall, impartially too, for one finds the Italian car pusher at the opera, and the consulting engineer at the music hall, drinking his beer with the rest of the boys. St. Patrick's Day, Fourth of July, Labor Day, and Christmas are the great holidays, generally rendered memorable by a prize-fight, a horse-race or coursing. Big dinners and big drinks are the favorite means of entertainment. Because of the winter cold, many of the men are clad in furs, and diamonds flash from their fingers and ties more frequently than they do from the women elsewhere.

As a town Butte presents a queer jumble of unpainted shacks and magnificient steel buildings, all built helter-skelter around some tall gallows-frame or smoke-stack. A miner often lives within ten yards of his own little shaft, his cows and chickens running over his dump, the week's wash hung from the head-frame and fluttering in the mingled coal smoke and smelter fume. First laid out as roads, the streets are a tortuous perplexing maze, skirting wastedumps, veering from high board fences around some shaft, and all following the rough contour of gulch and hill. Sight is often unavailing because of thick clouds of fume and fog, yet the locomotive's shriek, the engine's exhaust, the cable rattling over the sheaves, the piano's jangle, continually greet the ear, and the mingled odors of sulphur, coal, whiskey, and garlic assail the nostril, each guiding one wheresoever he desires.

Night and day the streets and hills are alive with men, coming off or going on one of the three shifts. On a bright day the congestion of humanity often renders progress slow. From a distance the town is prettiest by night with the myriads of electric lights dotted

over the hills, sudden brilliant glowings marking the lurid path of the molten slag from the smelters.[896]

During this period the Butte hill gradually came under the control of the Amalgamated Copper Company, a holding company incorporated in New Jersey in 1899 with Daly as president. One by one, the Butte mines and smelters were absorbed by the Amalgamated, which either owned outright or controlled the operating companies. When first formed, the holding company controlled the Anaconda Copper Mining Company and its reduction operation, the Washoe Copper Company, and also the Parrot Silver and Copper Company and the Colorado Smelting and Mining Company.[897] In 1901 Amalgamated absorbed the Boston and Montana Consolidated Copper and Silver Mining Company and the Butte and Boston Consolidated Mining Company while the company's leadership, under Henry Rogers, engaged in stock manipulations and financial schemes which left thousands of small investors bankrupt. Even at a time of questionable morality on Wall Street, this became known as the "Crime of Amalgamated".[898]

Consolidation of the Butte District was, in a way, necessary to end the constant litigation which at the time closed many of the mines, threw thousands out of work and even threatened to paralyze the entire mining camp. The feud finally culminated in 1906 when Amalgamated bought out the Heinze holdings for $12 million. In 1910 Anaconda acquired many of the major mining operations on the hill and by 1915 it had outgrown the parent corporation and bought out Amalgamated. In 1924 Anaconda purchased the assets of the Davis-Daly Copper Company and in 1923 they bought out the rest of the Clark holdings with the purhase of the Clark-Montana Realty Company. In 1940 the Butte and Superior Mining Company was purchased and by 1950 Anaconda owned all of Butte's mining operations.[899]

In 1947 an elaborate, multi-million dollar "Greater Butte Project" to "blockcave" the underground mines was announced. It was hoped the project would open a new era of underground mining but instead it turned out to be a costly mistake (Malone and Roeder 1976). Although underground mining continued until the early 1970s, the company increasingly concentrated its efforts on the more efficient and profitable open-pit operation at the Berkeley Pit. This became the company's mainstay until it was shutdown along with all the company's Butte mining operations in the summer of 1983 due to low grade ore and low copper prices.

The mining era of Butte's history appears to be over yet it is this turbulent and colorful history which still gives Butte its unique character. As Michael Malone writes: " . . . not the least of Butte's resources is its remarkable history. One of America's most intriguing

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[896]Mining and Scientific Press Aug. 25, 1906, 93(8):230-233; Feb. 19, 1916, 112:286-287; Jan. 5, 1918, 116:20.
[897]Malone, Michael P., 1981 The Battle for Butte: Mining and Politics on the Northern Frontier, 1864-1906. University of Washington Press, Seattle.
[898]Ibid.
[899]Montana Standard June 28, 1982.

ethnic melting pots, most bizarre corporate battlegrounds, and most interesting historic places, the city savors its past and works increasingly to preserve it".[900]

Summit Valley Mining District
By: Jon Axline

Several resources concerning placer mining in the Butte area were reviewed for information on Brown's Gulch. Unfortunately, there seems to be some confusion over the name of the district in which the gulch is located. Although the General Land Office records indicate that the mine was located in the Oro Fino Mining District, there are no references to that district in any of the sources. It is more likely that it was originally located in the Summit Valley mining district, then was incorporated into the Summit Mountain mining district. Warren stated in 1876 that the Summit Mountain district was further divided with claims nos. 75 to 310 placed within the Independence mining district. The property's close proximity to the Butte district (they are located in the same township/range) has further made any mention of placer mining in the Independence district rare.

Charles Warren's 1876 history of the Butte area provided the best information about placer mining on and around Silver Bow Creek. Most of the information left by Warren concerns the initial development of the area and then concentrates on the Butte silver mining industry and prominent people associated with it. Muriel Sibell Wolle in *Montana Pay Dirt* echoes much of the information provided by Warren. Other sources pay only lip service to the Butte area's placer mining heritage, instead concentrating on the silver and copper industries.[901]

William Allison and G. 0. Humphrey are generally credited with discovering gold in the vicinity of present-day Butte sometime in 1864. Allison and Humphrey developed the Butte-area mines as hard rock operations. At about the same time, other prospectors discovered rich placer gold deposits on Silver Bow Creek in the vicinity of the junction of Interstates 15 and 90 about five miles west of Butte. In 1864, Allison and Humphrey helped formed the Summit Valley mining district and, in 1865, it was sub-divided with the Silver Bow area incorporated into the Summit Mountain mining district. As stated above, the Independence district was carved out of the Summit Mountain district by the end of 1865. Placer mining prospered in the Butte and Silver Bow areas in 1866 and peaked in 1867. By 1869, however, two drought years resulted in the abandonment of most of the mines. There is some evidence, however, that the mines had begun to play out in 1868. Both Warren and Wolle have written that the diggings were relatively shallow and were not that rich when compared with the Alder and Last Chance Gulch placers. Indeed, if it were not for some extensive ditch systems,

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[900]Malone, Michael P., 1981 The Battle for Butte: Mining and Politics on the Northern Frontier, 1864-1906. University of Washington Press, Seattle.

[901]Warren, Charles S. "The Territory of Montana," in *Contributions to the Historical Society of Montana.* Volume 11 (Boston: J.S. Canner and Company, Inc., 1966).

many of the mines would have been relegated to seasonal hydraulic operations. There is no evidence of hydraulicking at Placer #90.[902]

The sources reviewed indicated that most of the 100 placer claims in the vicinity of Silver Bow and Butte were worked out in 1867 before the onset of the drought years. Although the construction of several ditches in 1868 sparked a brief, but intense, renewal of interest in the mining districts, they languished until 1875, when William A. Clark and others began developing the hard rock silver mines in the district. Several sources have stated that the population of both camps dwindled to less than 200 individuals after the collapse of the placer boom.[903]

The 1877 General Land Office map shows no mineral claims in Brown's Gulch or its immediate vicinity. The 1878 update of the GLO map, however, shows two mineral claims in the SE I/4 of Section 9. Again, it does not show any mineral claims in the NW I/4 or the NE I/4 of the section where Placer #90 is located.[904]

The most insightful glimpse into the history of mining in Township 3 North, Range 8 West is provided by volume 2 of the Montana Land Tract books. According to the records, 1,309 mineral entries were made in the district. Of those, only 33 (2.4%) were placer claims. The placer claims, moreover, were concentrated in Sections 17, 19, 21, 23, 24 and 25 in close proximity to Silver Bow Creek and averaged 93.45 acres in size (Placer #90 was 72 acres). Only three placer claims were located in Section 9, T3N, R8W. There were 26 hard rock lode claims in the section. The tract books, moreover, indicate that the placer claims were made over a period of 42 years between 1872 and 1914. Only 13 (39%) of those claims were patented. The historical record indicates that there was probably a significant number of placer claims made in the district beginning in 1864. Because the claims were registered with the local miner's court, however, the records after about 1869 do not exist. Based on trends in other mining districts, it is probable that the claims were registered with the miner's court and abandoned when they played out in the late 1860s before the GLO survey. The transient nature of mid-19th century mining camps supports this argument. The post-General Land Office survey records show that most of the claims were abandoned when they played out.[905]

There were three placer mine operations listed in Section 9, T3N, R8W in the land tract books. Besides Placer #90, the Rosalba Placer and the Missouri Placer were also present in the section. There was legible information about the Rosalba Placer. The Missouri Placer was claimed by James Murphy and Maurice Eisenberg in August, 1910 (Entry #03775) and patented in May, 1912 (#263377). It was a 142.153 acre claim in the SW 1/4. Because Placer #90 was located in the NW 1/4 and the NE 1/4, the Missouri Placer was not a reworking of the older diggings. Fully 85% of the mining activity in the section and, indeed, the township/range was in hard rock mining.[906]

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[902]Wolle, Muriel Sibell. *Montana Pay Dirt: A Guide to the Mining Camps of the Treasure State.* (Athens, Ohio: Sage Books, 1962).
[903]Writers Project of Montana. *Copper Camp* (New York: Hastings House, 1943).
[904] General Land Office Maps, 1877 and 1878 update. Department of Natural Resources & Conservation, Helena.
[905]Montana Land Tract Books, volume 2; GLO, 1877.
[906]Ibid.

There is little information regarding this specific placer mine. The cultural resource report for the Brown's Gulch project indicates that Conrad Kohrs, Dallas Newcomber and William W. Dixon filed on a 72± acre placer claim in the NE ¼ NW ¼ NW ¼ NE ¼ NW ¼ W ½ SW ¼ NW ¼ NE ¼ of Section 9, T3N, R8W in November, 1872. The partners patented the claim in June 1874. Charles Warren reported in his centennial address to the Montana Historical Society in 1876 that In 1868, Geo. Roff, William Schofield and others commenced the construction of a ditch from Brown's Gulch to the mines on Oro Fino Gulch, and completed the same in the spring of 1869. The water season of 1869 being of short duration, and having become involved in the construction of the ditch, they were compelled to sell the same, and it was purchased by E. S. Newman for $18,000. Afterwards Kohrs, Newcomer [sic] & Dixon became the owners of the property and worked it for several years, when they sold it to John Noyes, who is now the owner of the same.

No other information specific to this mining operation was discovered during my review of the most promising records involving mining in the Butte area.[907]

One of Montana's pre-eminent pioneer stockmen, Conrad Kohrs arrived in Montana in 1862 and opened a butcher shop in Bannack the following year. By 1867, he also owned butcher shops in Virginia City, Helena, Deer Lodge and Blackfoot City. In 1865, Kohrs relocated to Deer Lodge and established a large cattle ranch headquartered in the former residence of Johnny Grant. Leeson (1885) and Joaquin Miller (1894) reported that Kohrs and his half-brother, Nick Bielenberg, had maintained their interest in mining although their primary investment was in cattle. While there was extensive mention of their interests in the Pioneer placer mines west of Deer Lodge, there is no mention of the-men's Butte area activities. A lawyer, William W. Dixon arrived in Montana Territory in 1866. He first practiced his profession in Helena and Deer Lodge, before relocating to the Black Hills in 1879. Upon returning to Montana in 1881, he opened a law practice at Butte, eventually becoming an attorney for the Anaconda Copper Mining Company about 1902. Leeson wrote in 1885 that Dixon had invested in some Montana mines, but they "proved unsatisfactory to him." There is little information available about Dallas Newcomber. The 1870 Montana territorial census lists him as a 24 year-old Maryland native who was the Probate Judge in Deer Lodge. All three men were living in Deer Lodge in the 1870s and likely invested in Placer #90 as a hobby-mining venture. There is no mention of Roff, Scholfield or Newman in any of the historical sources for Montana Territory. John Noyes was a prominent Butte real estate developer and mining entrepreneur. He arrived in Butte from Idaho in 1865. Although he initially invested in placer mines, Noyes began investing in hard rock mining operations in Butte in 1885. Placer #90, apparently, was one of many placer properties that Noyes owned in the Butte area between 1865 and 1885.[908]

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[907]Warren, Charles S. "The Territory of Montana," in *Contributions to the Historical Society of Montana.* Volume 11 (Boston: J.S. Canner and Company, Inc., 1966).

[908]Leeson, M. A. *History of Montana, 1739-1885.* (Chicago: Warner, Beers & Company, 1885).

There were only two other known placer mines located in proximity to the site and the historical record indicates that the primary thrust of mining in the area was underground hardrock mining at the time the placer was in operation. The claim was not developed during the second (and more important) phase of mining in the Butte area between 1875 and 1893. Surviving records of other placer mines in the township/range indicate that the bulk of the area's placer mining occurred to the south of Placer #90 in the immediate vicinity of Silver Bow Creek.

Although Conrad Kohrs owned Placer #90, along with William Dixon and Dallas Newcomber, it is unlikely that the partners had any direct involvement in the day-to-day operation of the mine. That task was likely left to a fourth individual who is as yet unknown. A prominent cattle rancher and entrepreneur, Kohrs was primarily interested in mining in and around Pioneer - a mining camp located just west of Deer Lodge. Dixon was a successful Butte attorney who later was associated with the ACM. By his own admission, Dixon was not savvy enough to invest in any profitable Montana mining properties before 1885 (Placer Mine #90 was likely in operation only between 1872 and 1877 when it was probably abandoned). Newcomber was a Deer Lodge Probate Judge.

BACKGROUND HISTORY OF THE BUTTE/ ANACONDA

By: Mark Fiege, Fredric Quivik, and Brian Shovers

Mining in the Butte/Anaconda area began inauspiciously in 1864 with the discovery of gold in Silver Bow Creek, just west of the present city of Butte. Here, prospectors unknowingly initiated a series of events that in twenty years transformed a mediocre placer camp inhabited by transient gold seekers into the industrial metropolis of Butte and one of the world's greatest mining centers.

The infant Silver Bow camp soon faltered, lacking enough gold to continue the boom. But the existence of silver in the area kept the nearby, newly established city of Butte from becoming a ghost town. At first, the difficulty of extracting and refining silver inhibited miners from exploiting it. These men did not have access to either the technology, capital or transportation systems needed to make the large-scale recovery of silver from complex ores possible. By 1870, only a few hundred people remained in the area.

In the 1870's, Butte miners began to industrialize their operations with the financial assistance of local banks. In 1875, William Farlin constructed a 10-stamp mill with a loan from the bank of William Andrews Clark. Other stamp mills followed, including that of entrepreneur Andrew Jackson Davis. Butte soon had a thriving economy based on silver. In 1876, Marcus Daly, an employee of the Walker Brothers silver mining partnership of Utah, arrived in Butte to assess the possibilities for purchasing a mine. On Daly's advice, the Walker Brothers bought the claims to the Alice lode, which eventually became one of Butte's most lucrative silver mines. After his own purchase of

the Anaconda mine, Daly went on to become Butte's most famous mining magnate as superintendent of the Anaconda Copper Mining Company.[909]

By 1887, there were 290 stamps processing silver ore in Butte.[910] Ironically, the perserverance of many early developers such as Farlin brought them little in return. Shrewd businessmen, such as Clark, Daly and Davis, accumulated the fortunes. The Panic of 1893 ultimately led to the demise of the silver boom. However, exploitation of silver had allowed Butte miners to acquire the capital and technology necessary to take advantage of other mineral deposits.

Before they were able to extract the red metal from Butte ores and while they were focusing their attentions on silver, Butte miners recognized that the Butte Hill held rich deposits of copper ore as well. Although the first significant copper claim was staked out in 1864, most of the major copper claims were located between 1871 and 1879. In 1876, Billy Parks found a fourfoot wide copper vein at a depth of 150 feet, initiating a century of copper mining and processing in Butte on a grand scale.[911]

An important factor in Butte's industrialization was the construction of numerous smelters for processing ore. In 1879, the Colorado Smelting Company became the first plant in Butte to produce a purified grade of copper. Prior to this, ore was hauled by freight wagon to Corrine, Utah, some 400 miles away. From there, it was shipped east for smelting. By 1881, the Parrot Smelter turned out high quality silver-copper matte. The Montana Copper Company also smelted a large share of Butte's early riches. Later, the construction of the Butte Reductions Works, Colusa, and the Butte and Boston, and other smelters eliminated the need to ship primary ores elsewhere for processing.

The arrival of railroads and the continuing expansion of milling and smelting facilities in Butte fostered the growth of the copper mining industry. Railroads, attracted to the city's mineral wealth, made Butte a destination point of Western expansion. In 1881, the Utah and Northern Railroad, part of the Union Pacific system, connected Butte with the rest of the industrializing United State Other railroads such as the Great Northern, the Northern Pacific and the Milwaukee Road soon followed. The Butte, Anaconda and Pacific, a local shortline, was completed in 1893.

The meteoric success of Butte and Anaconda was directly linked to a growing demand for copper in the electrical industry in the 1880's. Electricity was beginning to be used throughout the United States for lighting and industry. With this new technology came a burgeoning need for copper wire. The time was right for a small mining town on the Montana frontier to become a great producer of mineral wealth. The leading copper producing area in the United States at the time that Butte's copper boom started was the Upper Peninsula of Michigan, where mining districts covered an area about 100 miles long. Mining engineers and investors in Michigan and the world over watched in

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[909]For a good overall history of Butte's origin, including its mining origins, see Michael P. Malone's The Battle for Butte: Mining and Politics on the Northern Frontier, 1864-1906 (Seattle: University of Washington Press, 1981).
[910]William B. Daly, "Evolution of the Mining Practice at Butte," Engineering and Mining Journal, August 24, 1929, p. 280.
[911]Malone, p. 16.

amazement as Butte copper production increased year after year. Unlike Michigan, where copper was being extracted from a large geographical area, virtually all the copper in Montana came from one town--Butte. Observers were convinced that Butte could not maintain such a phenomenal growth in production, that soon the ore would play out. But in 1887, Butte surpassed Michigan in copper production to become the world's leader. Much to everyone's surprise, production continued to grow and Butte remained the world's largest copper producer until 1920.[912]

The leading mining company during Butte's ascendence was Daly's Anaconda Copper Mining Company. In the summer of 1883, he began planning and constructing a large concentrator and smelter and a new town to house smelter workers about 25 miles west of Butte. He called the new city Anaconda after his Butte mine. It, too, became a thriving city much like Butte. The Montana Union (a shortline jointly owned by the Union Pacific and the Northern Pacific) constructed a line from the Anaconda mine to Daly's new smelter in Anaconda. The smelter began operation in 1884. This new smelter had the largest concentrator in the United States at the time.[913]

In 1889, Daly put another smelter at Anaconda into service and these two combined facilities gave him the largest nonferrous metallurgical plant in the world. In 1891, he opened an electrolytic copper refinery, only the second such plant in the U.S. And in 1899, after already having enlarged and modernized his two earlier smelters, Daly decided to build yet another, the Washoe Smelter. It began operating in 1902 and, in turn, became the largest non-ferrous metallurgical plant in the world.[914]

Prior to about 1900, the mines on the Butte Hill were owned and operated by a number of relatively large companies. W. A. Clark controlled the Moulton Mining and Reduction Works and the Colorado Smelting and Mining Company as well as at least ten other valuable mines, including the Original, the Steward and the Gagnon. Marcus Daly, in partnership with George Hearst, J. B. Haggin and Lloyd Tevis, operated the Anaconda Copper Mining Company, which owned the Alice, Anaconda, St. Lawrence, and other mines as well as the great smelters in Anaconda. New York and Boston interests, such as the Lewishon Brothers, owned the Leonard, Colusa, Mountain View, Pennsylvania, Badger State, and other major Butte mines, the Boston and Montana and the Butte and Boston smelters in Butte and the new Boston and Montana smelter and refinery in Great Falls. Charles Meader owned the Montana Copper Company. F. Augustus Heinze, along with his brothers, formed the Montana Ore Purchasing Company and operated the Rarus and other successful mines. Struggles between these

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[912]The Mineral Industry: Its Statistics, Technology, and Trade in the United States and Other Countries from the Earliest Times to the End of 1892. Vol. I, Richard P. Rothwell, ed. (New York: The Scientific Publishing Company, 1893), p. 109. The Mineral Industry: Its Statistics, Technology, and Trade in the United States and Other Countries from the Earliest Times to the End of 1893. Vol. II, Richard P. Rothwell, ed. (New York: The Scientific Publishing Company, 1894), p. 241. Otis E. Young, Jr., "The American Copper Frontier, 1640-1893," The Speculator: A Journal of Butte and Southwest Montana History, Vol. 1, No. 2, Summer 1984, p. 7.

[913]Smith Ralph I., History of Early Reduction Plants of Butte, Montana (Butte: Montana Bureau of Mines and Geology, 1953 reprint), pp. 12, 13.

[914]Quivik Fredric L., "The Anaconda Smelters: Great Falls and Anaconda," The Speculator: A Journal of Butte and Southwest Montana History, Vol. 1, No. 2, Summer 1984. Titus Ulke, Modern Electrolytic Copper Refining (New York: John Wiley & Sons, 1907), p. 2.

interests for control of the Butte Hill, especially between Clark, Daly and Heinze, became known as the "War of the Copper Kings."

These individuals accumulated tremendous wealth and power, and their success stories helped feed the "American Dream" of rags to riches. William Andrews Clark was born to a farm family in Fayette County, Pennsylvania, in 1839. When he was seventeen years old, his family moved to Iowa. There, young Clark attended schools and also taught in the rural school district. In 1859, he moved to Missouri to teach. Word of the Colorado Gold Rush took' him west in 1862, and he gained his initial mining experience at Central City, Colorado. The following year, Clark moved to Montana to try his luck in the gold fields around Bannack. In his first summer, he earned $2,000, and that sum became the gem of his future fortunes.

Clark first went into wholesaling supplies for miners, then buying gold from miners for resale in the east, then making loans to miners, and finally into banking, establishing the First National Bank of Deer Lodge in 1872. Through its several reorganizations in the years to come, Clark's bank became one of the soundest in the United States. With his bank as a financial base, Clark began investing in mines in the nearby mining camp of Butte. Within a few years, Clark was one of the world's most wealthy men, and his Butte mines provided him the wealth to expand into other lucrative activities in Montana and elsewhere. Clark was not content with his financial power. He had political aspirations as well. To gain a seat in the U.S. Senate, Clark bribed members of the 1899 Montana Legislature to win election. This led to one of the great scandals of Montana history and a Senate investigation, the result of which was that Clark was denied a seat in the Senate. However, the 1901 Legislature elected Clark to the Senate without bribes. He served one term.

Marcus Daly was born in Ireland in 1841 and emigrated to the United States in 1856. After working in New York for two years, he headed west to the mining fields, first in California and then in Nevada and-Utah. Along the way, he learned the skills of mining and then managing and appraising mines. Having developed a good reputation, he was hired by the Walker brothers, Salt Lake City mining entrepreneurs, as foreman of their mine at Alta, Utah. Interested in expanding their mining empire, the Walkers sent Daly to Butte in 1876 to examine mining properties in the growing-Montana quartz mines camp. Based on Daly's favorable report, the Walker brothers bought the Alice Mine in Butte and made Daly part owner and superintendent. They shipped some of their milling equipment from Utah to Butte, and soon Daly and the Alice Mine were producing gold and silver and proving to outside investors that great wealth from the Butte hill could be realized.

Eventually, however, control of the Butte Hill passed from local individuals such as Clark and Daly to distant capital. Marcus Daly planted the seeds of this transfer of economic and political power by joining with William Rockefeller and Henry Rodgers of the Standard Oil Trust to form the Amalgamated Copper Company in 1899. The Standard Oil interests soon consolidated most of the major properties on the Butte Hill

under the aegis of Amalgamated. By 1910, Amalgamated exerted a virtual monopoly over the mining industry in Montana with the consolidation of major operations in Butte, Anaconda and Great Falls and through an integration of all aspects of the industry. Amalgamated came to control vast resources, including coal, timber, water, and hydroelectric systems.

Among other properties, the Amalgamated owned the dam at Black Eagle Falls in Great Falls, supplying power to the Boston and Montana Smelter and Refinery there, and the Canyon Ferry Dam near Helena, built on the Missouri River in 1902 to supply power to the mines of Butte. In 1912, a number of smaller power companies were merged to form the Montana Power Company--its operations controlled by Amalgamated and headquartered in Butte. In 1913, power from this company was used to electrify the Butte, Anaconda and Pacific, the first railroad in the U.S. to employ high voltage direct current (2400 volts d.c.) on its main line.

Although Amalgamated existed until 1915, it was as a name only, as most of the primary Butte copper and Montana mining interests were united under Amalgamated's Anaconda Copper Mining Company (ACM) in 1910. By 1915, when the federal government dissolved Amalgamated, the ACM owned almost all the major mines in Butte and the Anaconda and Great Falls concentrators, smelters and refineries. Furthermore, operations diversified to include the concentration and smelting of zinc and manganese, which appear in large quantities in certain parts of the Butte District.

With the consolidation of the Butte District, the ACM Company centralized the various activities historically performed by individual mines or companies. Consolidation affected all aspects of the mining process. For the first time, for example, a geology department was created to examine the district as a whole and make recommendations for future development. Mine timbers we're produced at a central framing plant in Rocker, although individual mines still maintained framing shops for special timbers. Most of the 30 shafts operated by the ACM were connected on the 2800-foot level to facilitate drainage and removal of mine water through a centralized pumping station.[915] Compressed air was delivered to the various mines for hoisting and drilling through 12 and 16 inch pipes connected to large compressor plants at the High Ore, the Leonard and the Bell. Two central heating plants were constructed to serve the entire hill, and shops for boilermakers, blacksmiths and machinists were centralized, although most of the larger mines still maintained their own blacksmith shops.

The heritage of Butte and Anaconda, though,, is more than just the history of large companies. The dangers and hardships associated with mining and smelting led to the birth of a powerful labor movement in the area. Butte's Miners Union, founded in 1878, became Local #1 of the Western Federation of Miners. In 1906, Local #1 sent the largest delegation to the founding convention of the Industrial Workers of the World (IWW) in Chicago. In the 19th century, Butte unions were very successful in having their demands met as mining companies competed for scarce labor. But as operations were

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[915]Daly (Note 2), p. 281.

consolidated under Amalgamated, unions lost leverage, leading to bitter and often violent struggles between unions and the ACM during the World War I era.

Copper promoted the growth of Butte, which became an unusual city in the West. Butte was a heterogeneous, cosmopolitan, urban setting in the midst of a largely rural, agricultural and wilderness environment. At one time, Butte boasted a population of nearly 80,000 inhabitants, making it one of the largest cities in the Northwest. Anaconda, although a much smaller city, was similar to Butte in its urban/industrial character. The populations of these two towns hailed from all regions of the United States and all corners of the globe. Early skilled miners were Cornish, although the Butte mines and Anaconda smelters also attracted many Irish, and they soon became the dominant ethnic group. The late 19th and early 20th centuries also saw an influx of others: Italians, Serbs, Croatians, French Canadians, Finns, Scandinavians, Jews, Lebanese, Chinese, Mexicans, Austrians, Germans, Swiss, and Black Americans. In 1910, 70% of Butte's population was either foreign-born or born of foreign parents. Today, the rich heritage of Butte and Anaconda is reflected in the diverse architecture of the two cities' residential, commercial, institutional, and industrial buildings and structures.[916]

The Anaconda Copper Mining Company continued to expand its operations for many years in other states and nations. In 1955, the ACM began open pit operations at the Berkeley Pit in Butte, which eventually became the largest truck-operated open pit mine in the U.S. Its development eventually consumed workings of several underground mines as well as significant portions of Butte's urban fabric. But despite an atmosphere of prosperity, declines in the world copper market and increased production costs at Butte and Anaconda plunged the two cities into economic decline. The Washoe Smelter was permanently closed in 1981. Many of the underground works had already closed by the time the Berkeley Pit opened. By 1982, the Kelley Mine, the last of the Butte underground mines, also ceased operations. The Anaconda Company suspended all mining in Butte in 1983, and today, demolition crews are in the process of demolishing the Washoe Smelter (all except the great stack, the tallest free-standing masonry structure in the world). Mining may someday resume in the area, but it will never again resemble its heyday.

HISTORIC BACKGROUND GERMAN GULCH
By: Hydrometrics

Most of the early white travelers into the intermontain region of western Montana avoided the German Gulch area. Early fur trappers entering the Rocky Mountains in the last decade of the eighteenth and the first decades of the nineteenth century did not explore the immediate German Gulch area. David Thompson with the Northwest Company was in the Missoula area in the winter of 1811-1812, but did not explore any further into southwestern Montana. The rival Hudson's Bay Company focused its activities in the early years in the Columbia River Basin and extreme Northwestern

[916]Allan Hooper, retired Anaconda Company hoisting engineer. Interview with Brian Shovers, September 5, 1984, Butte.

Montana. While it is possible that fur trappers may have operated or at least explored the German Gulch area there is no strong evidence to support it.

The Lewis and Clark expedition explored the Beaverhead Valley in 1805 and Clark traveled along the Big Hole River for a short distance.[917] This is as close as they came to the German Gulch area.

The St. Louis based Missouri Fur Company made several attempts to open fur trade with the Blackfeet in the Three Forks area between 1810-1823.[918] There does not appear to be any strong evidence to place the fur trappers of this company in the German Gulch area. The major white influx into the German Gulch area came only with the discovery of gold in the early 1860s.

Granville and James Stuart reported placer gold locations on Gold Creek west of Garrison, Montana in 1858. Miners did not start arriving in large numbers until the discovery of gold at Bannock in the summer of 1862. With this discovery miners began to arrive from the Salmon River Mines in Idaho, California and Colorado. With additional discoveries at Alder Gulch in 1863, Montana City in 1863, Last Chance Gulch in 1864, Silver Bow Creek in 1864 and Confederate Gulch in 1865, the mining boom was on in full force. Camps sprang up quickly along the sides of streams whose gravel beds yielded gold through placering or when worked hydraulically. A boom and bust sequence started at many of these camps. Placer deposits, some extremely rich, were exhausted in a relatively short period of time and miners soon traveled to -the scene of a new discovery. In some areas, lode mines were discovered early but many of these had to wait years for the capital needed to support full development.

The Idaho territory, of which western Montana was a part, was created in 1863. It was completely isolated. Sidney Edgerton of Ohio was appointed as Chief Justice of the Idaho territory. Governor Wallace of Idaho assigned him to the third district, which included Missoula County and areas east of the Divide. He arrived in Bannack late in 1863. Miners' courts and vigilante committees provided much of the early day law and order. The capitol of the Idaho territory was at Lewiston nearly 800 miles away and cut off from Montana a good portion of the year by snow.

A movement began quickly to have a new territory cut from eastern Idaho. Through the efforts of such prominent early-day Montana pioneers as Wilbur Sanders, Samuel Hauser and others, Sidney Edgerton was sent to Washington D.C. to argue for the creation of a new territory. This trip was successful and President Lincoln created the Montana territory on May 26, 1864 and appointed Edgerton the first territorial governor. Bannack was made the first territorial capital.

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[917]Elliot Coves, ed., History of the Expedition under the Command of Lewis and Clark, Volume 2, p. 403, 1893, New York.
[918]Paul C. Phillips, The Fur Trade, Volume 2, p. 263-264, 1967, Norman: University of Oklahoma Press.

Contemporaneous with the discovery of gold at Last Chance Gulch in 1864 was the location of placer claims in German Gulch. This marks the first influx of whites into this area.

A party of eight German prospectors led by Edmund Alfeildt and including John Kwartz, Fred Brown, John Sarex, Chris Mayers, Fred Clump, Fred Keis and Lewis Smidtland had heard of the gold discoveries at Bannack and Alder Gulch and traveled from mines on the Peace River in British Columbia and arrived at Deer Lodge then called Cottonwood late in the summer of 1864.[919] Edmund Alfeildt was a graduate of the University of Leyden and had come west with General Sidney A. Johnston on his expedition to Utah to deal with the Mormons. After his enlistment had expired, Alfeildt traveled to the Peace River to search for gold.[920] While in Deer Lodge the party conferred with Granville and James Stuart and were directed towards the German Gulch area. Whether the Stuarts had prior knowledge of placer gold deposits in German Gulch is not known, but it appears unlikely.

The party traveled up the Deerlodge Valley and camped one mile below the confluence of the German Gulch stream and the Clark Fork River, then known-as the Little Deer Lodge River.[921] Finding traces of gold, they moved further upstream, prospecting as they went until approximately 1200 yards above the three forks of North Creek, Beefstraight Creek and German Gulch creek on September 15, 1864 they pitched camp on the north bank of German Gulch where they made a major discovery of placer gold.[922]

The placer deposits yielded about $12 a day for each man. Several weeks later they left to travel to Silver Bow for supplies. They returned in the middle of October and began to work their discoveries. At this time they decided to move further up the gulch. This was delayed by heavy snows until January of 1865 when, after constructing a pump, they moved further up the gulch. After three days of travel, moving the pump through heavy timber, cutting a trail as they went, they broke ground approximately two and one-half miles above the junction of Norton, Beefstraight and German Gulch creeks. This was the official discovery of the German Gulch or Siberia District. They excavated a shaft to a depth of twenty-five feet, found gold on bedrock averaging $1.00 a pan. They immediately set up claims for themselves and several friends from Alder Gulch including Mr. William Edwards.[923] The claims were 100 feet in length and covered the width of the gulch. The original claim locations filed by these men have been lost.

Their discovery was made on Janaury 20, 1865 and was kept a secret for only a short period of time. Another prospector, Charles Bass, followed the group from Silver Bow Junction. Bass was given claim no. 21 below the discovery. Bass and Sorex left for Virginia City. February 22, 1865 was made the location day. Twenty claims were filed

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[919]W.R.M. Edwards, Pioneer Days in German Gulch (unpublished manuscript) 1908, page 1.
[920]Charles Warren, Centennial address on Montana and Butte (July 4, 1876) In: Contributions to the Historical Society of Montana, Volume II (1896) p. 65.
[921]W. R. M. Edwards, Pioneer Days in German Gulch (unpublished manuscript) 1908, page 1.
[922]Ibid, p. 2.
[923]Ibid, p. 2.

for the original group of eight Germans. Claim #21 went to Charles Bass. Claims #22, 23 and #24 were made for William Edwards and #25 was made for William Hutchinson.[924] Alfeildt who had been elected recorder kept a book of records.

By March 1, 1865, a number of cabins had been constructed on different claims and there were nearly a thousand men in German Gulch. Tremendous activity ensued in the spring of 1865 with many ditches under construction to bring water for placer operations. The settlement near the Three Forks of Norton, Beefstraight and German Gulch creeks was known as Lower Town and contained 80 houses by early June. Near the head of the gulch was Upper Town with almost 30 houses.

The price of gold supplies was high. Mr. Edwards relates that lumber sold -for 504 a foot, slabs at 504 each, sugar 80 cents a lb, nails $100/lb, flour $25/hundred, beef 20 cents a lb, bacon 60 cents a lb, and tobacco $5/lb.[925] Wheelbarrows cost $25 each and shovels $18 each. Picks went for $14 each and whiskey sold for 25 cents a drink. In describing the camp Edwards, now arrived from Virginia City wrote,

... Every man was working as only the pioneers of Montana could work. Little excitement arose to disturb the workers, except when someone would reach bedrock and finding it rich would pass the word along more to encourage the miners than in a spirit of exultation. The population was made up of men of all nationalities, but there never was a more genial assembly of Workers. Good nature seemed to prevail practically all the time and few quarrels occurred.[926]

The first grave in German Gulch was that of a man named Clark who was called "Old California", a professional gambler. James Blake shot him over gambling debts. Blake quickly disappeared and Clark was buried on a side hill.

In July of 1865, placer gold was discovered on French Gulch about eight miles to the west and a great many miners left, heading for the new discovery. French Gulch was discovered by French Canadian prospectors. In the summer of 1865, Dr. George Beal arrived in German Gulch from Virginia City. Dr. Beal, who was to become closely associated with the history and development of German Gulch and later Butte, came to Virginia City from Ohio in July of 1864.[927] Dr. Beal was born in 1828 in Harrison County, Ohio and received an M.D. degree from the Ohio School of Medicine in 1863. The Beal family was to maintain a close association with this area around German Gulch for nearly a century. Two other doctors arrived in the camp that summer, Dr. Charles S. Mussigbrod and Dr. Robinson. Dr. Mussigbrod was later an important mine owner in Garnet. Shortly after the shooting of "Old California" another incident involving a Sam Gowan and a man named Dowd occurred. Partners in a placer claim, these men had a quarrel and Gowan stabbed Dowd with a butcher's knife.[928] A miners'

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[924]Ibid, p. 2.
[925]Ibid, p. 3.
[926]Ibid, p. 4.
[927]Ibid, p. 5.
[928]James U. Sanders, ed., Society of Montana Pioneers, Volume 1, 1899, p. 226.

meeting was called and a trial held. Green Campbell served as chairman of the meeting. Gowan was sentenced to hang and -this was done the following day. It is of interest to note that five days after the hanging, Mr. Dowd under constant care of Dr. Beal, started to recover and later operated a freight line going to Blackfoot City. Mr. Edwards who witnessed the entire affair commented,

> ... The tragedy stopped all shooting and cutting scrapes in the old camp of German Gulch and I can say that the record of Deer Lodge will show less criminality and less litigation there than any other camp in that county. This Occurred 43 years ago, more than the average life of mankind. If there were more determined men now who administered such justice, crude as it was, there would be less crime today.[929]

The development of a number of commercial businesses occurred early in the development of the German Gulch camp. A man named Steinfield opened a grocery story in the summer of 1865 near Dr. Beal's "white house" located at the head of the gulch. Steinfield, after accumulating nearly $20,000, left camp to the dismay of his creditors who chased him and caught him at McCarty Mountain.[930] A grocery store was started late in the summer of 1865 by Mr. and Mrs. William Lincoln at Lower Town. John and William Vipond also opened a grocery story at Lower Town. Theodore H. Kleinschmidt, later to be associated with Samuel Hauser in the banking business in Helena, opened another general merchandise store in Lower Town. Mr. William Robb started a brewery near the Kleinschmidt store and Bill Buffington opened a saloon with the first billiard tables in the town.[931] A restaurant was started at Upper Town shortly after the summer of 1865. All supplies had to be packed to Upper Town by mules. Mr. Edwards described a certain man named Jackass Johnson who hauled most of the supplies to Upper Town for several months and who drove his mule train with a loud voice echoing a string of profanities in Spanish.[932] A number of blacksmith's shops, bakeries and several sawmills were also established in the German Gulch camp in 1865. A large number of saloons were established where beer and or tarantual juice was sold. Mr. Edwards describes this drink as costing 25 cents per shot and consisting of tobacco, pepper and whiskey.

Wages were high in the early days of German Gulch camp. From 1865 to 1870 nearly 400 men were at work in the gulch earning an average day's wage of between $6-$7. The camp provided an important market for farmers and ranchers of the Deerlodge valley.

By 1870, the camp had started to decline and some claims were being leased to Chinese miners. Mr. Edwards relates an amusing story concerning a friend of his, a rancher named Vinyard, and his first interaction with a group of early Chinese miners:

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[929]W.R.M. Edwards, Pioneer Days in German Gulch (unpublished manuscript) 1908, p. 5.
[930]Ibid, p. 6-7.
[931]Ibid, p. 7.
[932]Ibid, p. 8.

...Mr. Vinyard, who owned a ranch that is now part of Anaconda heard of the high price of chicken in German Gulch and drove in from his ranch with a yoke of cattle by way of Gregson Springs with several dozen chickens regarded by the Chinese as a great luxury. Arriving at Lower Town he encountered several Chinese miners. After looking at the tired oxen, the Chinese asked him how far he had come? Vinyard replied 20 miles. "Have you any wheat?" he was asked. Vinyard replied he had none. The Chinese miners held a meeting, studying the situation. He has no feed and the chickens will die before he can get them feed. We have him on the hip. $2 a dozen, and from that price they would not recede. Mr. Vinyard instead of the $14 a dozen was obliged in the face of circumstances to take the price offered, but to the credit of the Chinamen be it said as Vinyard often told me afterward, they gave him $3 per dozen. After that streak of sharp finance, the rancher used to find out the regular chicken days and was not caught again by such Wall Street sharpness.[933]

Mr. Edwards relates that several Chinese miners were still living in German Gulch in 1908. Mr. Edward's description of the early Chinese miners in German Gulch is of interest in that it lacks some of the prejudices displayed by other whites in Montana at the time.

... I must in truthfulness say the Chinese are industrious, liberal, hospitable and honest, and for frugality, cooperativeness and industry they can give some of the white race cards and spades and win cut.[934]

Several Chinese businesses were established in German Gulch in the early 1870s. A Chinese store and Fan Tan parlor was operated by one Hing Lee who also served as an interpreter. He was murdered in the fall of 1878 by a man with a hatchet. His watch and chain, $7000 in gold dust and $500 in opium was stolen. His partner, Sam Foke, was arrested but later released.[935]

Like many camps in the west, German Gulch was plagued by the hazards of the mining profession and had its share of mine accidents. In the spring of 1869 there was a cave-in in a drift in the No. 18 claim which caused the death of two young miners, Ephraiham Thorp and Timothy Driscoll.[936]

It appears from Mr. Edwards recollections that German Gulch always remained extremely isolated with few visitors except those that had business there. By the early 1870s the camp at German Gulch was undergoing changes. New laws were enacted and the old system of having each miner take care of his own waste material was done away with. Individual miners began to acquire a number of claims and began to construct bedrock flumes. Hydraulic mining was started on a large scale and companies were

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[933]Ibid, p. 8.
[934]Ibid, p. 9.
[935]Ibid, p. 10.
[936]Ibid, p. 10-11.

formed to conduct these operations. Chinese, who were now acquiring mining rights to supposedly worked-out ground owned several of these companies.

The records pertaining to the mining activity in German Gulch between 1864-1870 cannot be located. A thorough search of county records in Deer Lodge, Butte and Anaconda has not turned these records up. They may have been lost during one of several county seat changes. The earliest records for mining claims appear in the 1870s and 1880s. None of the original locators in German Gulch appear on these records. The claims filed during this time appear to represent a consolidation of a large number of smaller claims filed in the 1860s. It was in the 1870s that large scale hydraulic mining operations started in German Gulch. The Beal family and others were Involved in efforts to expand mining activity in German Gulch. Dr. George Beal became increasingly involved in business activities in Butte. He moved there in 1876 and built the Centennial Hotel near the present site of the Finlen Hotel. Dr. Beal was elected as the third mayor of Butte in 1881-1882. He continued to maintain his interests in his German Gulch properties. Dr. Beal was killed in a carriage accident in German Gulch in June of 1901. His son, Perry Beal, and his grandson, George Beal, continued to maintain mining interests in German Gulch until the death of George Beal in the 1960s.

> It was during the 1870s also, that a number of Chinese placer mining companies operated in German Gulch. No information could be obtained on their names or exact periods of operation. They may have leased the ground they worked over but no specific records can be found to verify these. On several of the plat maps that accompany the placer claims. Adjoining property will often be described as being worked by a Chinese company. It is apparent that Chinese placer miners became an important economic force in German Gulch in the 1870s and continued to dominate placer mining activity there until the turn of the century, primarily reworking placer ground just mined by white's In the 1860s.

In 1885, Gerry Creek Fluming Company was organized by Henry Williams Smith and Mayberry and Company to build a wood flume down German Gulch starting at the head of Norton Gulch. Apparently, some hard feelings developed between the Company and the miners owning ground in the gulch. A number of injunctions were filed in 1885-1886 in Butte District court against the fluming company.[937] The disagreements reached a peak with armed men from both sides facing each other across the flume. The dispute was apparently settled when the Gerry Creek Fluming Company bought out some of the- miners.[938] This was not the case, however, since the miners had an agreement not to sell unless all agreed. More trouble developed, a man was killed and a long murder trial was held in Butte resulting in the acquittal of the accused. The fluming company finally settled out of court and purchased the ground in dispute for $22,000.39 The flume was never completed and the company went out of

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[937]Ibid, p. 12.

[938]Butte District Court Records, 1897, Book D.

business. The fluming company had intended to use the flume to transport logs from a timber operation to the west and sell timber to the mines in Butte.

Mining in German Gulch continued through the 1890s on a much smaller scale, almost entirely through hydraulic operations. Hydraulic mining consisted of directing a concentrated stream of water at gold bearing gravels. This material was then channeled into a sluice and often through to a screen, which separated the gold from other sediments. In German Gulch, the gold was collected directly from riffles in the sluice boxes. In German Gulch the hydraulic hoses were directed at heavily faulted quartzites that were disintegrating from weathering and contain some gold values.

In 1907, the Montana Gold Mountain Mining Company was organized to develop lode and placer claims in German Gulch. It was incorporated in Butte on July 15, 1907.40 The incorporation papers list the following men as stockholders and company officers: John F. Davies (200 shares), William A. Creeden, Director (50 shares), Perry Beal (50 shares), P. T. Spaulding (50 shares), John MacGinnis (50 shares), J. N. Mennier (50 shares), J. G. Brown (50 shares) and J. M. Kennedy (50 shares).41 The company was capitalized at $2.5 million with 500,000 stock shares issued at $5/share.42 The company was incorporated for a period of 40 years. The first annual report does not appear until 1928 and then continued regularly until the 1940s.

The Montana Gold Mountain Mining Company acquired a number of placer and lode claims in German Gulch between 1910-1922. George Beal and Perry Beal originally located these placer and lode claims in the 1880s and 1890s. They were responsible for most of the development work prior to 1907 when the Montana Gold Mountain Mining Company was organized. This company was formed to raise capital to further develop the mines located near the head of German Gulch. Perry Beal was one of the original stockholders and remained associated with the company until his death in 1932.

The company built a concentrating mill on the creek near the mouth of tunnel #4 on the Clara Jurgens claim. The mill was valued at $5,000 and consisted of a battery of stamps, an amalgamation plate, two Wilfley tables, a boiler, a 25 h.p. engine and a Huntington Mill. It made only one run and was shut down on December 7, 1907 as a result of the financial panic of 1907.[939] 51 There is no evidence that this mill was ever operated again. In addition to the concentration mill, the company maintained three log cabins used as a bunkhouse, cookhouse and office.[940] They also constructed a sawmill and two placer ditches on the Keystone claim. The sawmill was operated by waterpower.

A sample of ten tons of ore was taken in the summer of 1915 for testing by the Anaconda Copper Mining Company. This ore averaged between $2.50 - $3.00 per ton in gold.[941]

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[939]F.R. Ingalsbe, mineral examiner's report on January Group Lodge Mining claims, January 22, 1916. Mining claim files, Deerlodge National Forest, Butte.
[940]Ibid.
[941]Ibid.

The Montana Gold Mountain Mining Company continued to issue annual reports through the 1930s but it appears that little development work was done. The board of directors in 1928 consisted of Perry Beal, Dora Bateman, Pearl McDonald arid Mabel Doering.

The company leased portions of the claims between 1937-1939 to the Anaconda Company who conducted extensive exploration work for possible development as a lode deposit.[942] 54 The Anaconda Company calculated 5 million tons of ore at $4.75 gold/ton at the 1932 gold price of $35.00 per ounce.[943] They described the low-grade ore zone as poorly defined but measuring 1400' easterly, 1000' northerly and 400' vertically.[944] 56 The Anaconda Company did not pursue the project any further probably due to the fixed price of gold which made mining a low-grade deposit unprofitable.

The Montana Gold Mountain Mining Company remained dormant and issued no annual reports during the war years. In 1947, papers were filed to extend the existence of the corporation to 1987. Mr. F. B. Winger is listed as President. No further reports are issued until 1969 when reactivation papers are filed listing Rex F. Henningsen of Butte as President and the company address at 116 West Granite Street in Butte. In 1973, an annual report was filed from Spokane, Washington, listing Vince D. McCarthy as President and Mr. Gerald McCarthy as Secretary. Silver Seal Inc. was listed as the owner of the property.[945]

The United States Smelting and Refining Company explored the area in 1970-1971. Placer Amex Inc. of San Francisco explored the claims in 1974-1975 as an open pit possibility. Neither of these companies followed up on their exploration studies.

With the increase in the price of gold in the past few years, this lowgrade ore deposit has become an economically feasible mining project.

The history of mining activity in German Gulch can he divided into the following four periods:

1.1865 - 1870: Placer camp with as many as 1,000 miners working and living in German Gulch. The yield from this period is estimated at between $5,000,000 to $10,000,000 in gold. This period is characterized by placer mining utilizing bedrock sluice and many Individual small claims. Many ditches constructed to bring water for washing gravels.

2. 1870 - 1907: By early 1870s, white miners leaving camp, being replaced by large numbers of Chinese miners. Continued placer mining using hydraulic method in this time period. Filing of first lode claim by Beal family. First development work on

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[942]Ibid.

[943]Open files report. Bea-L-Lode, Montana Bureau of Mines and Geology, Economic Division, Butte.

[944]Ibid.

[945]Montana Secretary of State Office - incorporation files: Montana Gold Mountain Mining Company, 1947. Helena, Montana.

underground lode deposits. Ditch companies formed. First recorded lode and placer claims.

3. 1907 - 1973: A new era begins in German Gulch with the formation of the Montana Gold Mountain Mining Company in 1907. A 20-ton concentrating mill erected. Attempts made to raise development capital through issuance of common public stock. Beal family remains closely associated. Panic of 1907 shuts down concentration mill. Periods of inactivity marked by leases to large mining companies for exploration work. No further development of underground mines. No records of extensive development or shipment of ores. Low price of gold makes development of low-grade ore deposits in German Gulch unfeasible.

4. 1973 - present: The Company moves to Spokane with new officers. Exploration activities by Placer Amex in 1974-1975. Due to increase in price of gold development of property was underway by Beal Mining Company, descendent corporation of the Montana Gold Mountain Mining Company.

German Gulch underwent the typical boom and bust cycle of many western placer mining camps. In later years with the price of gold fixed by the government, the low-grade ore deposits in German Gulch were economically unfeasible to mine. German Gulch always remained economically connected with Butte and in particular with three generations of the Beal family. It is unusual to find a single family so intimately associated with mining activity in an area for nearly a hundred years.

The French Gulch Mining District
By: Alen S. Newell (HRA)

Contemporary with the discovery of gold at Bannack, Alder Gulch and Last Chance Gulch was the location of placer claims at French Gulch in the Mount Haggin Area. Two Frenchmen are credited with making the discoveries in 1864.[946] French Gulch, as did many of the placer mining districts in Montana Territory, soon attracted a variety of itinerant prospectors. American, Spanish, German, and Chinese miners entered the Mount Haggin Area during these early years.[947] The names given to creeks in the Area reflect this diverse ethnic influence--German Gulch, French Creek, American Creek.

The French Gulch Mining District included some of the more important mining properties in southwestern Montana. The district encompassed French Creek, California Creek, American Creek, Oregon Creek, and their minor tributaries. In the first four years since its discovery, the district yielded between $1,000,000 and $5,000,000 in gold nuggets and dust.[948] The gulch was a roaring gold mining camp, similar to hundred of others throughout the West. The town of French Gulch, located at the junction of French Creek and First Chance Creek (Section 1, T2N R12W), served as

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[946]Charles J. Lyden, "The Gold Placers of Montana," State of Montana Bureau of Mines and Geology, MEMOIR NO. 26 (Butte: 1948), p. 24. See also "Placer Mining, French Gulch, Montana," THE MINING WORLD 20 (1904), p. 24.
[947]William R. Allen, THE CHEQUEMEGON (New York: The William-Frederick Press, 1949), p. 19.
[948]Lyden, "The Gold Placers *of* Montana," p. 24; and "Placer Mining, French Gulch, Montana," p. 24.

the logistical focal point for miners who worked the numerous creeks and draws in the district. A road from the Deer Lodge Valley to French Gulch linked the town to the rest of the Territory.[949] Another "pioneer trail" bisected the Mount Haggin Area and connected the gulch with the Big Hole Valley.

W. R. Allen, a future lieutenant governor of Montana, was born in the town of French Gulch in 1871. Allen's father had arrived in French Gulch six years earlier and had located one of the earliest placers at "Allen's Bar. "[950] In his later published reminiscences, the younger Allen recalled what it was like to live in the isolated community of French Gulch.

Supplies had to be freighted in from either Salt Lake City over the Corrine Road or from Fort Benton over the Mullan Road.[951] During the months November to May, snow, usually three to six feet deep, prohibited the delivery of large quantities of supplies. No freighters dared approach French Gulch. The only goods to reach the isolated community were those that were carried by men on snowshoes from the lower valleys. Mail that arrived from Warm Springs once a week during the winter was transported in this way.[952] After spending the winters of 1871-1873 at French Gulch, the Allen family moved to a ranch in the Deer Lodge Valley. Thereafter, the elder Allen worked his placer claims on French Gulch only during the summer months.[953]

French Gulch was the scene of some excitement during mid-August of 1877. Chief Joseph's band of Nez Perce Indians had left their home near Lapwai, Idaho, that summer and were engaged on an epic march to Canada. On August 9, the Indians were encamped along Trail Creek in the Big Hole Valley when they were attacked by troops from Fort Shaw under the command of Colonel John Gibbon. In the ensuing battle, Gibbon lost 29 men killed and 40 wounded while the Nez Perce losses were 83 dead.[954]

One day after the "Battle of the Big Hole," two soldiers arrived in French Gulch on their way to Butte for reinforcements. Not expecting the Indians to withdraw from the field, Gibbon anticipated the need for more men to replace his fallen troops. After changing horses at French Gulch, the troopers headed toward Butte. One day later, a relief column of 200 civilians, including William A. Clark, came through French Gulch on its way to the Big Hole. The men encamped at the town on the night of August 11.[955] The anxiety of the townspeople must have been raised even further by the presence of this armed camp. However, Chief Joseph's warriors had secretly abandoned the scene of battle on the night of August 9, heading southeast toward Yellowstone National Park. Shortly thereafter, some of the army wounded from the fight were treated at French

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[949]This road probably followed closely the present State Highway 274.
[950]Allen, THE CHEQUEMEGON, pp. 17-18.
[951]The Mullan Road, built by Lieutenant John Mullan in 1860, extended from Fort Walla Walla, Washington, to Fort Benton, Montana. The Corrine Road served as the north-south connection between the Union Pacific Railroad line at Corrine, Utah, and the gold camps of Montana.
[952]Allen, THE CHEQUEMEGON, p. 22.
[953]Ibid., P. 23.
[954]Burlingame and Toole, A HISTORY OF MONTANA, Vol. 2, pp. 183-84.
[955]Allen, THE CHEQUEMEGON, p. 36.

Gulch by doctors who had traveled to the town from Butte.[956] The crisis over, the fortunate miners returned to their prospecting.

Placer mining in the French Gulch Mining District, as in other mining districts, was a temporary phenomenon. The readily available nuggets from gravel bars and exposed crevices soon dissipated. By 1877, it was no longer profitable to recover gold with only a pan, rocker and sluice box. Many miners left the area at this time. Others, who had sufficient determination and capital, invested in the abandoned placer claims and began hydraulic mining in the gulch.

Hydraulic mining consisted of directing a concentrated stream of water at a potential gold-containing gravel area. The hundreds of cubic yards of material that would be dislodged in the-process was channeled through sluice boxes to a screen, which would remove the sediment from the gold. This operation was essentially a more elaborate, and destructive, means of placer mining. It required the diversion of large amounts of water to the site of the hydraulic activity. The origin of many ditches along Oregon, California and American Creeks can be traced to this period of mining history of French Gulch. [957]

The Allen family took advantage of the decline in placer mining at French Gulch by purchasing a number of the original diggings. Soon, the senior Allen had acquired most of the French Gulch camp.[958] Other less ambitious prospectors also entered the district. Many of these new arrivals were Chinese. As in other mining districts throughout the West, Chinese succeeded Anglo miners at the old tailings. Leasing the placer claims from their owners, the Chinese methodically worked the mined-over gravel bars and beds. They often established small log dwellings near a claim or assumed residency in an abandoned cabin or even a mine tunnel. In the French Gulch District, there is a Chinese town and cemetery reported in SE/4 SE/4 Section 1, T2N R12W.

The Chinese probably left the French Gulch area during the mid-1890s, somewhat later than they did many mining districts.[959] A number established themselves in the larger communities of the West, including Butte. In 1890, the Chinese population of that community was 391. After 1910, the number of Chinese in Butte declined, to a total of 155 in 1930.[960]

As placer mining for gold declined in French Gulch and other mining districts in Montana, prospectors turned their attentions to other minerals. Silver, of course, was a valuable commodity that engaged the energies and capital of numerous individuals. More importantly, copper mining in Montana, notably at Butte, began to attract the interest of ambitious capitalists, like Marcus Daly.

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[956]Ibid., p. 36.
[957]Ibid., p. 38.
[958]Ibid., p. 39.
[959]Mary Paddock Berthold, BIG HOLE JOURNAL: NOTES AND EXCERPTS (Detroit: Harlo Press, 1973), p. 24.
[960]Rose Hum Lee, "The Growth and Decline of Chinese Communities in the Rocky Mountain Region" (unpublished Ph.D. Dissertation, University of Chicago, 1947), p. 84.

Marcus Daly made his initial investment in the "Butte Hill" in 1880. With the support of San Franciscans George Hearst, James Ben Ali Haggin, and Lloyd Tevis, Daly established the Anaconda Silver Mining Company. Shortly thereafter, Daly struck the fabulous copper lode at Butte and turned his attentions toward the exploitation of that metal. In 1883, he platted the town of Anaconda at Warm Springs Creek, twenty miles west of Butte. Construction of a smelter known as the Upper Works in 1883 marked the beginning of Daly's and the Anaconda Copper Mining Company's rise to prominence in Montana economic history. Anaconda and Butte soon became the industrial seat of Montana.[961]

Since the mid-1880s, Deer Lodge County has been noted for the copper smelting works at Anaconda. Much of the twentieth-century history of the county and the Mount Haggin Area is linked with the economic expansion and periodic contractions of the "Company." Notwithstanding this focus, the French Gulch Mining District continued to contribute to the mineral wealth of the region.

In 1898, William R. Allen, who had been working for the Anaconda Company, left that firm's employ and assumed control of his father's mining properties at French Gulch. In conjunction with his acquisition of timber interests in the area (see Section D), Allen soon consolidated most of the mining placer and lode claims in the district. They encompassed more than 800 acres of land. The Spain and McKinley mines were the cornerstones of what became the Allen Gold Mining Company (see Figure 3) (Sections 4, 5, 6, 7, 8, 9, T2N R11W; Section I T2N R12W; Sections 27, 29, 30, 31, T3N T11W).[962]

The McKinley and Spain were subsurface mines. The McKinley mine had a shaft of 100 feet, while the larger Spain mine reached 200 feet below the surface. More than 30 men worked either above or below ground at the mines.[963] In addition to the Spain and McKinley lodes, Allen worked a number of placer claims by hydraulic methods. More than fifteen miles of ditches carried water "to work several hydraulic giants, and an Evans hydraulic elevator.[964] This enabling the operators to handle an immense amount of gravel The elevator had a capacity to carry between 500 and 1000 yards of dirt and was used in areas where the stream gradient was too low to carry the sediments.[965]

In 1900, Allen installed a dredge in the French Gulch district. The "Mildred" was a boat dredge that had buckets for digging stream gravel and conveying it to a screen that separated the gold from the tailings. It was one of the first large dredges to be established in Montana.[966]

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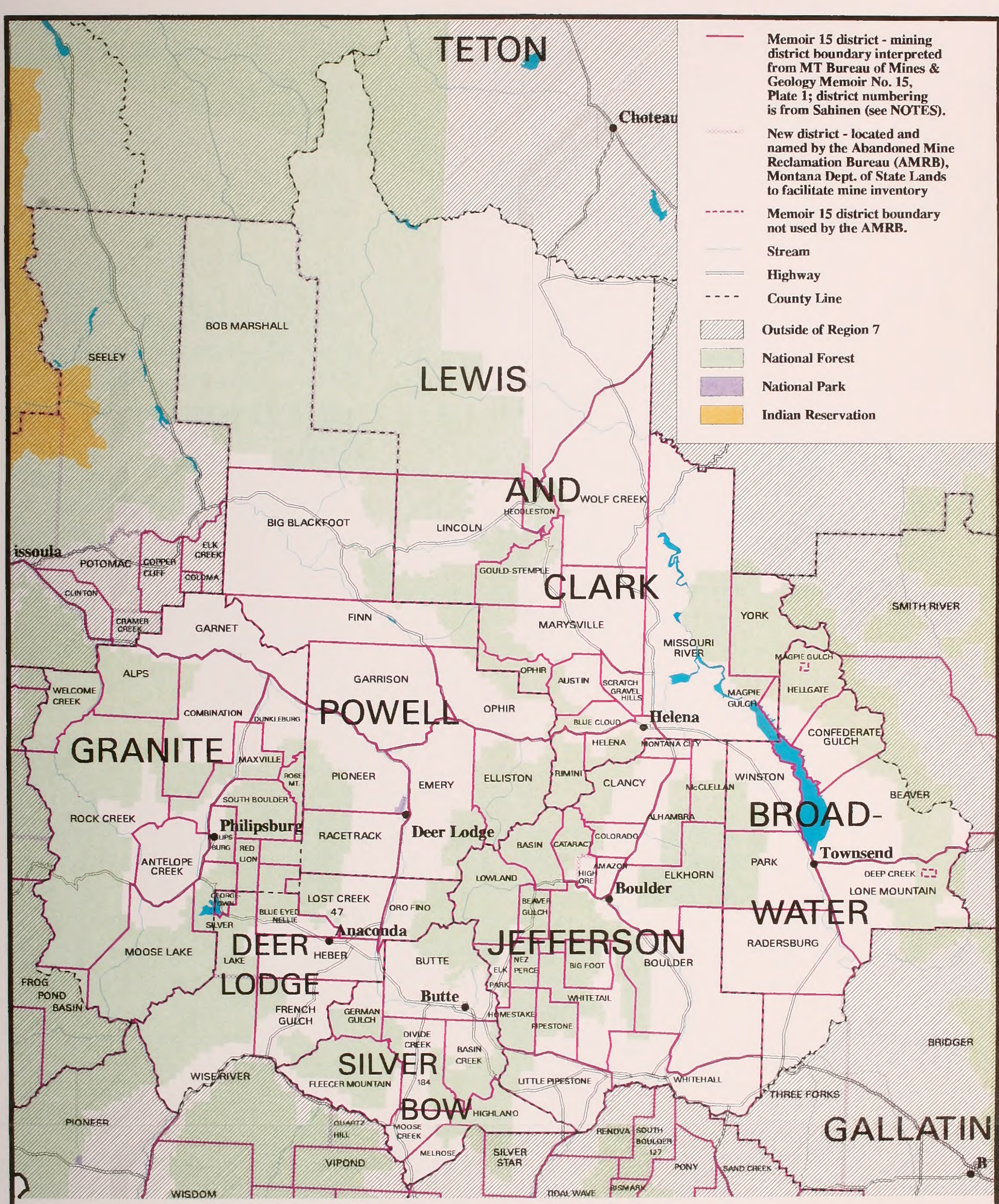
[961]Burlingame and Toole, A HISTORY OF MONTANA, Vol. 1, pp. 347-38.
[962]Allen, THE CHEQUEMEGON, P. 87; "Placer Book" (Deer Lodge County Assessor's Office, Anaconda, Montana), p. 20; "Lode Book" (Deer Lodge County Assessor's Office, Anaconda, Montana), p. 72.
[963]"Biennial Report of the State Inspector of Mines of the State of Montana, 1909-1910" (Helena, December 1, 1910), p. 62.
[964]"Placer Mining, French Gulch, Montana," pp. 24-25.
[965]Ibid. See also EIGHTH REPORT OF THE BUREAU OF AGRICULTURE, LABOR AND INDUSTRY OF THE STATE OF MONTANA (Helena: 1902), P. 440.
[966]EIGHTH REPORT OF THE BUREAU OF AGRICULTURE, LABOR AND INDUSTRY, p. 440.



REGION 7

III - 217 - MAP 7

Scale of Miles

0 10 20 30

Albers Equal Area Projection,
centered at 109.5 W,
standard parallels at 46 and 48 N.

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Through this combination of underground lode mining, hydraulic placer mining, and dredging the Allen Company succeeded in establishing a profitable business in French Gulch. Reportedly, several of the carloads of ore that were shipped from the district ranged as high as $19 per ton.[967]

William Allen continued his mining and timber operations at French Gulch during the first decade of the twentieth century. In 1904, he was elected to the Montana State Legislature as a representative from Deer Lodge County on the Republican ticket. In 1908, he was elected as Montana's Lieutenant Governor.[968] Allen retired from politics in 1913, shortly after his mining and timber companies developed financial problems. Ultimately, a shortage of operating capital forced Allen to withdraw from his ventures and to sell his property to the Anaconda Copper Mining Company.

The French Gulch Mining District was one of the more important gold mining areas in Deer Lodge County. Although the amount of gold that was recovered from Montana mines gradually decreased during the early 1900s, French Gulch continued to yield profitable paydirt.[969] Perhaps the large amount of capital that Allen needed to return a profit at French Gulch and his heavy investment in lumber operations overextended his financial capabilities. Nevertheless, as late as 1948, one informed geologist estimated that a profitable return of gold could still be dredged from the lower sections of California and Oregon Creeks.[970]

Highland City Montana
By: James D. Wilde

Highland City is located along the northern bank of the North Fork of Fish Creek. This mining camp was founded late in the summer of 1866 after the discovery of gold in Upper Fish Creek. By winter of that year, Highland City contained over three hundred houses, five dance halls, ten saloons and five thousand people (Davis, 1962: 225). Red Mountain City had a water system consisting of hydrants and pipes made from green logs, a hotel, two general stores, a blacksmith shop, a Masonic Lodge and a doctor's office. By the summer of 1867, Red Mountain City was the largest settlement in Deer Lodge County, which at that time extended from the Highland Mountains north to the Canadian border (Wolle, 1963: 184). The placer gold from Fish Creek and the nearby gulches was exceptionally pure and averaged $20 per ounce, but it soon began to run out, and only a few lode claims were able to produce. By the end of the summer of 1867, the population had begun to trickle out of the Highlands back toward Butte.

One lode claim which created much excitement, but which eventually led to the ruin of the district, was the Ballarat Mine. It was discovered in late spring of 1867 by four men from Red Mountain City who mined the ore and stored it nearby, all the while boasting

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[967]"Placer Mining, French Gulch, Montana," p. 26.
[968]Allen, THE CHEQUEMEGON, pp. 124-27.
[969]See various REPORTS OF THE BUREAU OF AGRICULTURE, LABOR AND INDUSTRY, 1900-1904.
[970]Lyden, "The Gold Placers of Montana," p. 26.

of its richness. The mine became well known throughout southwestern Montana and everyone waited expectantly for a large cleanup that would ensure the permanence of Red Mountain City. After a few months the four miners finally crushed their accumulated ore and found that it contained only a minute amount of gold. Afraid of being ridiculed after all their boasting, the men melted all the dust they had into a small nugget which they took to town and displayed as a sample of their ore. This so amazed everyone that word quickly spread and a Professor George C. Swallow, of Deer Lodge, became convinced that the property should be developed. He interested two St. Louis capitalists in the venture and was put in charge of a company to purchase and, work the Ballarat and surrounding property. A 24 stamp mill was 'Shipped from St. Louis and erected near the mine. Cabins for the men and their families were built nearby and Professor Swallow himself built one with a fine stone fireplace (Davis, 1962: 229). Things went well for four years until the stockholders from St., Louis began to wonder why they had received no dividends. Another professor, Philip Knabe, was sent to investigate and reported a year later, in 1872, that not only the Ballarat Mine but also "the whole gulch (wasn't) worth two bits) (quoted in Wolle, 1963: 184). The operation was immediately shut down and the mill was dismantled and shipped to Butte.

Highland City and Red Mountain City were virtually deserted by 1874, and both are poorly preserved at present. Highland City, consists of a rail-fenced cemetery, and four log cabins in fair' condition. What are probably cabin foundations and decayed remains are barely discernable in the grassy meadow where most of Highland City once stood. An Old Forest Service sign marks its slaughterhouse, southwest of the meadow, but all that remains is a large scatter of cow bones.

The four cabins were most likely originally part of Highland City but were maintained by one John Kern, the only inhabitant after 1874. He reportedly stayed to work his placer and to tend the grave of his sweetheart, a dance hall girl named Lulu who shot a drunken miner-who was molesting her and thereby became known as Shotgun Liz. She died in 1867 and Kern stayed near her gravd until he died in 1923. All four cabins were constructed with square and then later refurbished with round nails.

REGION 8

Aside from the early discoveries of gold in the Northwest corner of Montana, and the discoveries near Gold Creek, Mining did not attract large numbers of miners until the find along Grasshopper Greek. This all took place in the Southwest corner of Montana where the first two territorial capitals were, Bannack and Virginia City. Region 8 contains these earliest placers, and the hard rock mines that were developed later. A good cross section of these mining districts is dealt with on the following pages.

Early Placer Mining In Montana
By: HRA

For the most part, the Pioneer Mountains region lay undisturbed and virtually unknown throughout the 1840s and 1850s. This isolation would abruptly end during

the early 1860s, as the region was suddenly overrun by prospectors and miners trying to strike it rich in one of the country's last major gold rushes.

It is not known who first discovered gold in Montana. Some credit Father DeSmet, who reportedly was aware of traces of gold in the Bitterroot area, but kept it secret because he dreaded the effects a gold rush would have on his Indian charges. John Owen, who ran a trading post at Fort Owen in the Bitterroot Valley, made a laconic entry in his journal on February 15, 1852, which simply said: "Gold hunting. Found some." Nothing more was said or done, indicating the discovery was not taken very seriously, or was of little consequence. Another claimant as the first to find gold was a mountain man, John Silverthorne, who showed up at Fort Benton in 1856 with over $1500 worth of dust. But Silverthorne would not divulge the source of the gold, and there is no way to tell if it was even found in Montana. A better claim as the first came from a half-blood Indian called Benetsee whose real name was Francois Finlay. Reports years later credit Benetsee with finding gold in 1850 or 1851 in the Gold Creek area near present-day Garrison, Montana.[971]

None of the above "discoveries" are of any real importance since none of these were publicized or substantiated and so had no part in starting the gold rush. James and Granville Stuart and Reese Anderson made the first gold strike of real consequence. They were returning from the California gold fields in 1857, and ended up spending the winter of that year in the Beaverhead Valley. In the spring of 1858 they traveled through the Deer Lodge Valley.[972] They had heard of Benetsee's reported strike in the area and tried their luck with a prospect hole at Gold Creek (then called Benetsee Creek) and found a good showing of colors. However, they were not able to work their find until 1862. Although it was the first real gold strike in the region, it was never a great bonanza, and it is questionable whether this led to the overall rush into the region.[973]

In any case, conditions were ripe for an influx of prospectors to the region. The California, Nevada and Colorado gold fields were in decline; the Indians were no longer a threat; and with the advent of steamboat traffic to Fort Benton and the building of the Mullan Road to the west the region became accessible for the first time.[974] Many miners gravitated to the region while on their way to the Idaho gold fields. One such group, from Colorado, was trying to find a short cut through the Bitterroots in the summer of 1862 when, on July 28th, John White and William Eades found a rich strike of placer gold on Grasshopper Creek, just south of the Pioneer Mountains.[975]

The real rush was now on, and by the autumn of 1862 the town of Bannack had sprung up around the diggings with some 500 inhabitants. By the spring of the following year it had grown to over a thousand. The gold taken on the Grasshopper was some of the

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[971]Cushman, Dan, 1973 Montana - The Gold Frontier. Stay Away, Joe Publishers, and Great Falls.
[972]Toole, K. Ross, 1959 Montana: An Uncommon Land. University of Oklahoma Press, Norman.
[973]Stuart, Granville (edited by Paul Phillips) 1925 Prospecting for Gold From Dogtown to Virginia City 1852-1864. University of Nebraska Press, Lincoln.
[974]Cushman, Dan, 1973 Montana - The Gold Frontier. Stay Away, Joe Publishers, and Great Falls.
[975]Toole, K. Ross, 1959 Montana: An Uncommon Land. University of Oklahoma Press, Norman.

purest ever found. Most of it assayed at 990 fine (99% pure) or higher. It has been estimated that in the year following the first strike, more than five million dollars' worth of gold was taken from the gulch. With this much gold and no real government, it is not surprising that Bannack attracted not only miners, but also a motley assortment of gamblers, prostitutes, saloon owners, merchants and road agents. Violence was epidemic, although disease killed more than bullets or knives. Living in cold, damp dugouts and cabins when they weren't working in the freezing winds and waters on their claims, the miners died of pneumonia, typhoid, tuberculosis and other diseases. One estimate places the death count at ten per cent between the months of September and May.[976] During its brief boom, Bannack was a typical rough and dangerous mining camp. But, within a year, it had peaked as the best claims were worked out and the miners left for the new strikes in the area.

The town survived and settled into a more tranquil existence. During the winter of 1864 vigilantes cleaned out the worst of the road agents that under the leadership of Sheriff Henry Plumber, had terrorized the area. On May 26th the town was named as the territorial capital, with Sidney D. Edgerton appointed as the first governor. Mining continued in the area even though the placer deposits were worked out. Gold-bearing quartz veins were found in the hills near Bannack, and the first stamp mill in the Montana Territory was set up during the winter of 1862-1863. Known as the Bannack City Quartz Mill, the hand-built six-stamp mill was driven by a water wheel and pounded out $1,500 worth of gold per week. The following year a stream-driven mill with twenty-four stamps was set up, processing ore for as little as four dollars a ton.[977]

Following the strike at Bannack, miners swarmed over the region and even richer gold finds were made. In May 1863 the greatest placer rush in Montana's history was set off by the strike at Alder Gulch. Within a year and a half some ten thousand persons were living and working in the towns of Virginia City, Nevada City, and numerous other towns strung along the gulch for some fourteen miles. In its first five years it is estimated the gulch produced between thirty and forty million dollars worth of gold.[978] Equally rich strikes followed at Last Chance Gulch and Confederate Gulch near Helena. Other smaller mining camps grew like mushrooms and then disappeared with equal speed.

Bannack would undergo a revival in the 1890s when the old placer claims were re-worked by dredges. In 1895 the Gold Dredging Company built the "Fielding L. Graves" which was the first successful, electric, bucket lift dredge in the country. Four other boats were built to work the gravels of Grasshopper Creek, while a sixth operated on Jeff Davis Creek at Horse Prairie. Most of the dredges worked profitably until 1902 when they ran out of auriferous gravel. These later operations were not as picturesque as the early placer mining period, but they were far more productive. The total production from the Bannack area has been estimated at 12 million dollars.[979]

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[976]Cushman, Dan, 1973 Montana - The Gold Frontier. Stay Away, Joe Publishers, and Great Falls.
[977]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage Books, Denver.
[978]Malone, Michael and Richard Roeder, 1976 Montana - A History of Two Centuries. University of Washington Press, Seattle.
[979]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage Books, Denver.

Bannack declined after the dredging operations ended, and became a ghost town by the 1920s. In the 1940s a movement developed to save the town, which led to it becoming a state park on August 15, 1954. Another major gold camp at the southern end of the Pioneer Mountains was Argenta, located at the mouth of Rattlesnake Canyon. It was originally called Montana when it was chartered on January 6, 1865, but this was later changed to Argenta. The placer deposits were of little importance, but the silver quartz lodes were exceptionally rich and Argenta became the territory's first recorded silver strike. To process the ore the first smelter in the Territory of Montana was constructed in 1866. The camp thrived for about a decade with its population reaching a peak of 1,500 persons. By the mid-1870s the town was all but deserted.[980]

Although Grasshopper Creek flows south from high in the Pioneer Mountains, no major gold strikes were made up stream from Bannack. Prospectors combed the headwaters for the mother lode without success. A decade or more later, the Pioneers would yield up precious metals, but they would, for the most part, be silver rather than gold.

One of the most important silver mines in the southern part of the Pioneers, the Polaris mine, was located on January 31, 1885, although some reports said the mine was worked sporadically for a time shortly after Bannack was founded. The main vein of ore was at a depth of one hundred feet, and was fifteen inches thick. The high-grade ore yielded from 75 to 400 ounces of silver per ton, and was a steady producer up to 1891. A New York syndicate, the Polaris Mining Company, bought the mine in 1892 and reportedly took out $250,000 before financial problems forced them out of business. J. E. Morse then bought the mine at a sheriff's sale and, he in turn, sold out to the Silver Fissure Mining Company in 1905. The company built a 100-ton smelter, which operated for only one year before it was forced to close down due to an insufficient supply of ore. Since then the property has been worked intermittently on a small scale. Total production from the mine is recorded at 4,243 tons, which includes 231 ounces of gold, 116,506 ounces of silver, 19,357 pounds of copper, 5,126 pounds of lead, and 11,900 pounds of zinc.[981]

Other silver mines were located in the vicinity of Bald Mountain at the southern end of the Pioneers. The Silver Key Lode mine operated between 1876 and 1885 and was a moderate producer. The Lost Cloud mine was worked in 1891 while the Silver Fissure mine produced $60,000 in silver during 1886.[982]

The most important silver strikes were made at the northern end of the Pioneers. The first major find occurred in April 1868, when John Vipond discovered the Mewonitoc lode, and gave his name to the district located around Quartz Hill and Vipond Park. The mines developed slowly due to their isolated location. A road had to be built to

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[980]Davis, Jean, 1962 Shallow Diggin's. The Caxton Printers, Caldwell, Idaho.

[981]Geach, R. D., 1972 Mines and Mineral Deposits - Beaverhead County, Montana. Bulletin 85, State of Montana Bureau of Mines and Geology. Montana College of Mineral Science and Technology, Butte.

[982]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage Books, Denver.

Dewey and then along the Big Hole River to Divide. From Divide ore was hauled to the railroad to Corinne, Utah for shipment to Swansea, Wales for refining.[983] The most important mine in the district was the Lone Pine, which was run for five years by the Partridge Brothers, and then was sold to an English syndicate, the Jay Hawk Company, in 1891 for $725,000. A twenty-five stamp mill and a concentrating plant were erected at the mine that produced $33,000 in silver each month and also considerable amounts of lead, zinc and copper. The operation closed in 1895 because of low silver prices and a depletion of ore. In 1933 the mine was reopened under the Quartz Hill Mining Company which had bought the property in 1928. The mine was a steady producer from 1933 to 1950. Some ore was also produced in 1958, 1961 and 1962. Total production from the Quartz Hill District from 1902 to 1965 was 57,261 tons of ore, which contained 1,118 ounces of gold, 1,024,485 ounces of silver, 198,991 pounds of copper, 72,032 pounds of lead, and 500 pounds of zinc.[984]

By far the richest strike made in the Pioneers occurred early in the summer of 1873, when James Bryant, Jerry Grotevant and some other men were in the area on a trapping expedition. Bryant wanted to relocate a claim he had made the year before along Trapper Ridge. While trying to catch some loose horses, Grotevant picked up a rock to throw at one of the horses and noticed that it contained native silver ore. Word soon leaked out, and throughout the summer the area was swarming with miners looking for other lodes. Many were found and a number of mines were located in the vicinity. Soon after, the town of Trapper City was built along the sides of Trapper Creek. Trapper City and the mines were to be short-lived, however, as the main development in the area shifted to the mines on Lion Mountain.[985]

The rich silver-lead outcrops on this bare, white rock up thrust were discovered shortly after the strikes at Trapper Ridge. The unusual mountain was named when a friend of Grotevant, one Joe McCreary, mistook Grotevant's white mule for a mountain lion and ran to camp for help. When his mistake was discovered, the other miners made sure McCreary would never live it down and named the mountain where the mule was spotted as "Lion Mountain." The area developed rapidly and in the spring of 1877, Noah Armstrong, who owned the Atlantis mine in the Trapper area, took over most of the workings on Lion Mountain under the Hecla Consolidated Mining Company. The company would dominate the district from this point on. The town of Lion City grew up at the base of the mountain. At its peak it had a population of five to six hundred. A forty-ton lead smelter was built at Glendale. At its peak the mining operation produced annually one million ounces of silver and thousands of tons of lead and copper. Although working conditions in the mines were extremely difficult due to the bitter cold and rarified air, some twenty miles of underground workings were driven into the heart of Lion Mountain.

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[983]Geach, R. D., 1972 Mines and Mineral Deposits - Beaverhead County, Montana. Bulletin 85, State of Montana Bureau of Mines and Geology. Montana College of Mineral Science and Technology, Butte.
[984]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage Books, Denver.
[985]Davis, Jean, 1962 Shallow Diggin's. The Caxton Printers, Caldwell, Idaho.

In 1881 the Hecla Company reorganized and came under the direction of Henry Knippenberg. Shortly after he assumed control, Knippenberg had the town of Hecla built a mile away from Lion City.[986] The mill and leaching works at Glendale were rebuilt and enlarged after a fire destroyed the original plant in 1879. By 1885 the plant consisted of three blast furnaces, two crushers, a large roaster and other facilities. Transportation from the mine was improved with the construction of a four-mile long narrow gauge tramway from Hecla to the concentrator.[987] A further transportation boost was given to the operation in 1882 with the completion of the Utah and Northern Railway. The line ran from Ogden, Utah to Silver Bow, Montana, along the eastside of the Pioneers through Melrose. A satellite industry of supplying charcoal to the smelting furnaces at Glendale developed at this time.[988] The company used up to 100,000 bushels of charcoal a month. The wood was supplied by Canadian and French woodcutters who cut the trees. The wood was then burned in pits by Italian laborers who delivered the finished charcoal for eleven cents a bushel. The mining operations finally ended in 1904. During the twenty year period of operations under Knippenberg, the mines produced an estimated $22 million worth of silver and other metals and paid dividends to stockholders totaling $2,057,500.[989]

The 1880s were the boom period for Montana silver mines. The railroads finally reached western Montana during the first years of the decade, which brought many ore deposits within economical distance to smelters and reduction works. During the decade the territory was usually the second largest supplier of silver in the nation, except for 1887 when it was first. An offshoot of the silver boom was a revival of gold mining and an increase in production of zinc, lead and other metals usually found with silver. During this period the territory's average annual silver output came to an estimated $20 million.

Unfortunately, an artificial base that collapsed in 1893 supported the silver boom. During most of the western silver boom worldwide production of silver increased, while at the same time many nations were dropping the silver standard as a base for their currencies. These two factors drove down the price of silver and should have ended the boom. The industry was, however, propped up by the Sherman Silver Purchase Act, which mandated the government to buy the domestic output of silver for coinage. This support came to a crashing end during the Panic of 1893 when President Grover Cleveland became convinced the Sherman Act was a prime cause of the depression and prevailed on a special session of Congress to repeal the act. It was a blow from which the silver industry and the mining industry in general, never really recovered. From this point on much of the silver, gold and other metals mined in

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[986]Wolle, Muriel Sibell, 1963 Montana Pay Dirt. Sage Books, Denver.
[987]Davis, Jean, 1962 Shallow Diggin's. The Caxton Printers, Caldwell, Idaho.
[988]Geach, R. D., 1972 Mines and Mineral Deposits - Beaverhead County, Montana. Bulletin 85, State of Montana Bureau of Mines and Geology. Montana College of Mineral Science and Technology, Butte.
[989]Winchell, Alexander N., 1914 Mining Districts of the Dillon Quadrangle, Montana. Department of the Interior, United States Geological Survey - Bulletin 574, Government Printing Office, Washington.

Montana were for the most part merely a by-product of the large-scale copper mining at Butte.[990]

With the end of the silver and gold mining boom in southwestern Montana, the emphasis switched to the search for non-precious metals. Increasing demand for metals such as lead, zinc, copper and tungsten has lead to increasing mining development in the Pioneers and the surrounding regions. Work on mining properties of this type has been undertaken since the turn of the century, although on a low level, intermittent basis.

Spiralling technology largely caused by World War Two, and the post-war government stockpiling policy further encouraged mining of non-precious metals. The tungsten deposits in and near the study area grew in significance. Two major mines were operated in this deposit. The mine cuts into the south wall of the Rock Creek Canyon, just west of Browns Lake. The Ivanhoe claim was first patented in 1903 and was originally worked for copper and silver. Decades later in 1942 R. C. McLaughlin studied some of the stockpiled ore with ultraviolet light and found fluorescent tungsten minerals. Following this discovery, McLaughlin and his associates organized Fluorescent Mines, Inc., and staked seventeen mining claims, fifteen on the north side of Rock Creek and two on the south side. A small tabling mill was set up in 1944, which produced tungsten concentrate from about 30 tons of tactile, mined from workings on the Garnet claim (one of the fifteen-staked claims on the north side of Rock Creek). Nothing more was done with the property until 1952 when the holdings were taken over by American Alloy Metals, Inc. who did some exploration work on the Ivanhoe claim. The next year American Alloy Metals leased the property to Minerals Engineering Company who worked the deposits. In 1954 Minerals Engineering Company bought the stock and assets from American Alloy and mined the deposits from an open-pit operation. The ore was treated at a 300-ton flotation mill located at Glen, and then the concentrates were sent to Salt Lake City for refining. From 1954 to 1956 the Browns Lake deposit was Montana's leading producer of tungsten. However, production was stopped in 1958 after the government terminated its domestic stockpiling program. Up to that point the mine produced 625,107 tons of ore averaging 0.35 percent tungsten.[991] It has been reported that the original mine tunnels of the Ivanhoe remain intact with some of the original machinery still inside, although the entrances have been covered over by talus from recent workings on the property.

The Lost Creek mine is located in the project's south unit on the North slope of Twin Adams Mountain. For a time it ranked second to the Browns Lake deposits as a producer of tungsten ore. The property was developed in 1951 by Minerals Engineering Company and its operation peaked from 1952 to August, 1956, producing 21,150 tons of tungsten ore which averaged 0.18 percent tungsten.[992]

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[990]Malone, Michael and Richard Roeder, 1976 Montana - A History of Two Centuries. University of Washington Press, Seattle.
[991]Geach, R. D., 1972 Mines and Mineral Deposits - Beaverhead County, Montana. Bulletin 85, State of Montana Bureau of Mines and Geology. Montana College of Mineral Science and Technology, Butte.
[992] Ibid

The current world situation, and a steady demand for tungsten has led once again to projects intending to exploit this tungsten resource.

Historic Background of the Summit, Browns Gulch and Hungary Hollow Mining Districts in Madison County Montana.
By: Bureau of Land Management, Butte District

Montana's mining history began before the area was established as a U.S. territory. Indeed, a gold rush precipitated the first significant white occupation, providing the population needed for territory status.

Following an unremarkable gold discovery in the Clark Fork drainage in 1858, a significant placer deposit was found in 1862 on Grasshopper Creek in what would become Beaverhead County. The following year, the most productive placer area in the state's history was discovered at Alder Gulch where Virginia City and smaller mining camps were quickly established. other major strikes were made in the region but the initial mining boom began .to wane before 1870 as the placers were work out. -The area's first economic boom, however, resulted in the establishment of Montana Territory in 1864.[993]

Small scale lode mining (hard-rock or quartz mining) began during the placer boom when miners learned that some of the richer hard rock gold deposits near the surface of some areas could be extracted by "free milling". Simply grinding the ore was all that was needed to extract the gold and it was not long before most of these deposits were mined. Deeper, mineralogically more complex ores, which comprised the vast majority of the mineral reserves, required more complex processing to acquire the precious metals. Mining these deposits and those of silver and copper also required large outlays of capital for equipment and a transportation infrastructure to handle equipment, ore/concentrate, and finished product. Significant lode mining, therefore, had to await the development of railroads.[994]

With the arrival of rail transportation in the early 1880s, the territory's incipient lode mining business boomed, as did the population. The most significant mining for the next decade centered around silver production at Butte, Philipsburg, and many smaller operations. As the silver market collapsed in 1893, a worldwide increase in the demand for copper made it the region's premier mineral resource with production centered in the Butte/Anaconda area. Hard rock gold production also increased as expanding transportation networks and improved milling/processing technology made it profitable to mine lower grade ores in previously inaccessible areas.

Mining production was depressed along with the rest of the economy in the 1930s, although the decade saw an increase in small operations. Unemployed miners and others engaged in subsistence level gold operations over much of western Montana.

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[993]Montana, A History of Two Centuries by Michael P. Malone and Richard B. Roeder. University of Washington Press. Seattle. 1976.
[994]Ibid. pp. 140-151.

World War II brought renewed activity in the copper industry but precious metal production ended on government order in 1943. Since the war, mineral production has continued to be a significant factor in the state's economy despite fluctuations which correspond to world and national markets.[995]

Unquestionably, mining and mining related activity is significant in the state's history and in some respects it has figured prominently at the national level. As stated above, the initial gold rush established Montana Territory and its political structure. Gold from the territory's placer deposits was an important Union asset during the Civil War, helping to maintain the government's credit and ability to trade abroad. Lode mining of the late 19th and early 20th Century was the economic foundation around which the dominate social patterns developed in western Montana. Mining interests were also the major political force in the state during this period.

Mining history in the study area began with the 1863 placer discovery at Alder Gulch. This was to become the most productive of the early placer operations in the region, yielding an estimated thirty to forty million dollars in gold by 1869.[996]

A number of mining districts were created in the immediate area as miners quickly established claims in rich gulches south and west of the growing community at Virginia City. Other mining camps were erected in the upper gulch; (Fairweather, Pinegrove, Highland, Summit and Union City) the largest was Summit located in a mining district with the same name. By the fall of 1863, miners were living and working along a 14-mile stretch of the gulch where the population had grown to an estimated 20,000.[997]

The placer boom had ended by 1870 as the richest deposits were depleted. However, Chinese miners leased many of the claims and continued for the next 25 years to extract dust and nuggets missed during the boom period.[998] Caucasian miners were also placering parts of the gulch as late as 1887.[999]

Lode mining in the area actually began during the placer boom with claims located in 1864 and mills in operation the following year.[1000] These early hard rock operations were oriented around free milling of oxidized ores within 200 feet of the surface. Several of these deposits were very rich, particularly in the Summit District, but they too were depleted before 1890.[1001] One source indicates that this early quartz mining

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[995]See "Preservation Planning overview for Phase 25 of Projects 25 and 26, Selected Mining Districts, Part One, for The Montana Department of State Lands". GCM Services, Butte, August, 1989 for a succinct summary of Montana mining history.

[996]Montana, A History of Two Centuries by Michael P. Malone and Richard B. Roeder, University of Washington Press, Seattle, 1976.

[997]Montana Pay Dirt, A Guide to the Mining Camps of the Treasure State by Muriel Sibell Wolle, Sage Books, Denver, 1963.

[998]Ibid. pp. 38-39.

[999]"Statistical and Descriptive Report upon the Mines, Farms and Ranges of Madison County, Montana". by George F. Cope, Compiler. Sept. 1888. Montana School of Mines, Butte 1936.

[1000]From Wilderness to Statehood, A History of Montana.. by James M. Hamilton, Binfords & Mort, Portland, 1957, p. 264.

[1001]"Report of the Inspector of Mines and Deputy Inspector of Mines for the Year Ending Nov. 30th 1890". G.C. Swallow, Inspector, J.B. Trevapthen and Jacob Oliver, Deputy Inspectors. Report on file at Montana College of mineral Science and Technology, Butte. p. 49.

diminished as early as 1868 and that in 1876, the Oro Cache was the only active lode mine in the Summit District.[1002]

Large-scale dredging of placer deposits in lower Alder Gulch commenced in 1896 and continued until 1922 (by the Conroy Placer Company). Steam powered and later electric dredges extracted a stimated nine million dollars in gold during this period.[1003]

Completion of the Northern Pacific rail spur between Whitehall and Alder in 1901 stimulated renewed lode mining in the area. It then became possible to extract the more complex, medium grade ores and ship them to smelters for processing.[1004] Several mining and milling operations were begun during the next decade and operated intermittently through the first half of this century.

During the early placer mining period, dwellings and camps were apparently constructed along a 14-mile stretch of Alder Gulch from above Summit to below Junction. The reconnaissance did not reveal any dwellings or other structures from this period. Natural deterioration and the effects of later placer and lode mining have all but eliminated buildings and other structures, which may have been associated with the boom of 1863-1870. Intermittent episodes of renewed placer activity have changed the landscape in Alder Gulch and its tributaries from their appearance in 1870.

Stamp mills and arrastras were constructed in the Summit District to process free-milling ores from about 1865. There were apparently at least 8 mills in the district in 1871 but their names and locations are difficult to find.[1005] Wolle (1963) states that a mill was constructed on Bachelor Gulch in 1865 to handle ore from the Oro Cache and a larger mill on the Oro Cache itself. She also quotes an article from the Montana Post, which describes the Lucas Mill, located about a half mile south of summit.[1006]

The Lucas mill, which Mr. Countryman designed and superintended the construction work was built of stone, and was 62 feet by 72 feet. The company... was only saving free gold. The last run of six days was satisfactory.[1007]

The mill ruin is located less than a mile south of the Summit townsite and a few hundred feet up a small eastern tributary of Alder Gulch. It is on the Lucas Lode, which was located in 1890 and surveyed in 1900. While the mill is not shown on the 1900 survey plat nor mentioned in the surveyor's notes, it is on the plat for the 323 Placer, which was surveyed in February 1875.[1008]

[1002]Montana Pay Dirt, A Guide to the Mining Camps of the Treasure State. by Muriel Sibell Wolle. Sage Books, Denver. p.45.
[1003]Ibid. p.41.
[1004]"Fourtheenth Annual Report of the Inspector of Mines of the State of Montana". John Byrne, Inspector and John J. Barry Deputy. Dec. 1, 1902. Report on file at the Montana College of mineral science and Technology. p. 52.
[1005]"Mining District of the Dillon Quadrangle and Adjacent Areas", U.S.G.S. Bulletin 574. by Alexander N. Winchell, Government Printing Office, 1914. p.159.
[1006]Montana Pay Dirt. A Guide to the Mining Camps of the Treasure State. by Muriel Sibell Wolle, Sage Books, Denver. p.44.
[1007]Ibid. p.44.
[1008]Mineral Survey Records. Bureau of Land Management, Butte.

Today, the site consists of the remains of thick stone walls of the mill building and a ditch probably associated with its operation. Local historian, Bill Babcock believes this to be the Lucas Mill and reports he has information that there was an arrastra here before the mill was constructed.

The Kearsarge Lode was one of the early producers of free milling gold in the Summit Mining District. It reportedly yielded a half million dollars from free quartz between 1865 and 1866.[1009] Largely dormant until the NP rail line was completed to Alder, the mine was developed to produce complex gold ores by Mr. Willard B. Millard beginning in 1901-1902.[1010] The claim was officially located in 1895 and surveyed in 1903.[1011] Millard and The Alder Company transferred a 60 stamp mill from the Kennett Mine to the Kearsarge in 1903 to concentrate ore for shipment to a smelter.[1012] In November of that year, there was a fire at the Kearsarge resulting in the death of 8 men and extensive damage to the mine.[1013]

For a brief period, the Kearsarge development employed up to 200 men and was the biggest hard rock operation in the upper Alder area.[1014] It had the largest mill and complex of associated buildings in the area's history, occupying much of the old townsite of Summit. After the fire, the operation faltered and apparently never realized its potential production.

The General Shafter (Shaftner) claim group is located near the head of Mill Gulch, a tributary of Alder Gulch with its mouth at Summit townsite. Located between 1901 and 1903, these four claims were surveyed in 1907 for the Shafter (Shaftner) Mining Company.[1015] The survey plat shows a mill, ore bin, bunkhouse, blacksmith shop and boarding house extant in 1907.

Summary articles on the Summit district do not mention the General Shafter (Shaftner) as being a significant producer.[1016] It may have been a relatively modest operation. The owner-operator in 1902 was Thomas H. Teal at which time the mine had 1200 feet of tunnel and 275 feet of crosscut. Production was 15 tons per day with ore treated in a stamp mill and with plate amalgamation. Tailings were treated with cyanide.[1017] In 1906 the operator was T. B. Salisbury of Grand Forks, North Dakota who was shipping ore to smelters at East Helena.[1018] Salisbury was reported to have reopened the mine in

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[1009]"Statistical and Descriptive Report upon the Mines, Farms and Ranges of Madison County, Montana". by George F. Cope, Compiler. Sept. 1888. Montana School of Mines thesis, Butte, 1936. p. 9.

[1010]"Fourteenth Annual Report of the Inspector of Mines of the State of Montana." John Byrne, Inspector and John J. Barry, Deputy Inspector. Dec. 1, 1902. p. 57.

[1011]Mineral Survey Records. Bureau of Land Management, Butte.

[1012]"Mining District of the Dillon Quadrangle and Adjacent Areas." U.S.G.S. Bulletin 574. by Alexander N. Winchell, Government Printing Office. p. 162.

[1013]"Disaster at Kearsarge Mine" Mining World. Vol. 19, p.30-31, Nov. 14, 1903.

[1014]Golden Gulch, The Story of Montana's Fabulous Alder Gulch. by Dick Pace, private printing, 1962. p.77.

[1015]Mineral Survey Records. Bureau of Land Management. Butte.

[1016]For example, Winchell (1914) does not mention the General Shafter.

[1017]"Fourteenth Annual Report of the Inspector of Mines of the State of Montana." John Byrne, Inspector and Johy J. Barry, Deputy Inspector. Dec. 1, 1902. p. 57.

[1018] "Biennial Report of the Inspector of Mines of the State of Montana for the Years 1905-6.11 William Walsh, Inspector and William Orum, Deputy Inspector, Dec. 1, 1906. p.119.

1911 after several years of inactivity because it was thought to have been worked out.[1019]

The Bartlett Lode and Mill Site were located between 1881 and 1887 when they were surveyed for Henry Elling.[1020] Mr. Elling developed the major hard rock properties in Browns Gulch to the west but the Bartlett appears not to have been a big producer.[1021] The mine is located in the middle portion of Greybacke Gulch less than a half mile west of Alder Gulch.

The Marietta group of claims were located and surveyed in 1918 for the Barton Gulch Mining Company. At that time, there was a powerhouse, stable, blacksmith shop, cook house, bunkhouse and cabin on the JJJ Lode, one of the claims in the group. The property is situated at the head of Barton Gulch but was assigned by the surveyor to the Summit mining District.[1022]

Apparently, the Marietta "operated sporadically in the early years without success".[1023] In 1931 a mining engineer from Spokane, Washington was reported to have examined the mine with the intent of running tests and beginning production.[1024] Two years later, the Marietta mining and Milling Co. was organized to operate an electrically driven 100 ton flotation plant. A camp for 40 men was planned.[1025] Operations began in 1935 under the name of the Marietta Mining Company managed by W.L. Bell. The mine actually consisted of a 50 ton flotation mill, sawmill, blacksmith shop, assay office, cookhouse, bunkhouse, and family cabins. It was "paying its way" in 1936 with a silver to gold ratio of 5:1.[1026] The mine was still operating in 1938.[1027]

The Garrison Mine appears to lie on a large group of unpatented claims at the head of Alder Gulch. The mine workings, buildings and a mill are very near the Blade and Laclede but this writer did not determine if the latter patented claims were controlled by the Garrison firm. Rupert Garrison of Virginia City developed the mine in 1927 and operated it until the war order curtailed gold mining.[1028]

A mill was built for the Garrison mine in the 1930s but apparently it operated for only two years.[1029] The mine buildings consist of a superintendent's house, boarding house, cookhouse, and a number of sheds. Several of the buildings appear to be on public land

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[1019]Mining World. Vol. 34. p. 172, Jan. 21, 1911.
[1020]Mineral Survey Records. Bureau of Land Management. Butte.
[1021]"Statistical and Descriptive Report on the Mines, Farms and Ranges of Madison County, Montana". by George F. Cope, compiler. Sept. 1888. Montana School of Mines thesis, 1936. p. 45.
[1022]Mineral Survey Records. Bureau of Land Management. Butte.
[1023]"Gold Lode Mining in the Tobacco Root Mountains, Madison County, Montana." by S. H. Lorain. U.S.D.I. Bureau of Mines Information Circular 6972. Nov. 1937. pp. 58-60.
[1024]Mining Journal. Vol. 15, p.41, June 1931.
[1025]Mining Truth. Vol. 17-18. p.6, Nov. 2, 1933.
[1026]"Gold Lode Mining in the Tobacco Root Mountains, Madison County, Montana." by S. H. Lorain. U.S.D.I. Bureau of Mines Information circular 6972 November, 1937. pp. 58-60.
[1027]Mining Congress Journal. Vol. 24, p. 61, March 1938.
[1028]BLM Archaeologist, John Taylor inventoried the Marietta Mine in 1983 and concluded from his work that none of the early 1900 structures were extant at the time of his survey.
[1029]Information from Joe Faubion, Billiton Minerals Co.

in Lot 14 of Sec. 23 and the mill rests on public land in Lot 13 of the same section. The mine workings also consist of very large cuts into hillsides, mostly for assessment.

The Nelson Lode was one of the earliest claims located in the Summit District (1879), the Nelson Lode was surveyed in 1880. John and Edward Trout located the property but it was conveyed to Edwin G. Herendeen before its survey was complete. At the time of survey, improvements on the claim included a 7-foot by 4-foot shaft, feet deep with levels 100 feet long.[1030]

Little documentary information was found on the Nelson Lode. A 1911 journal article mentions the claim as having two shafts operated by a Parkinson and Stranahan. At that time, ore from the Nelson had been processed through the General Shafter Mill and it was discovered that different milling would be necessary to recover the values. The operators were considering erecting a mill on the Nelson if testing proved such an effort was warranted.[1031]

Wolle (1963) describes the 1863-placer camp of Summit as located in Alder Gulch at the mouth of Bachelor Gulch and "covered with tents and cabins ... a lively, noisy place with the usual saloon and hurdy-gurdy houses".[1032] Apparently most of the structures during the placer boom were made of logs, crammed closely together with very narrow intervening streets.[1033] One of the buildings was a Masonic Temple. Much of the Summit townsite was incorporated into the Kearsarge mining operation in 1902-1903. "Old cabins were remodeled and new buildings, such as a two-story boarding house with ten sleeping rooms, a two-story bunkhouse with accommodations for seventy-two men, a stable, 'double boarded and papered the same as a dwelling house', were made available".[1034]

Browns Gulch is a tributary of Alder Creek which enters the latter stream near Nevada City. Mining developed here in a pattern similar to that in the Summit District with heavy placering between 1860 and 1870. During this same period, there was also apparently some mining of free-milling gold ore from lodes near the head of the gulch, where a camp called "Bullion City" was established.[1035] Mining of complex ores began in the 1890s.

Browns Gulch was placered during the early mining boom around Virginia City and no doubt dwellings and other structures were constructed here as they were in Alder Gulch to the east and north. Subsequent placer activity in the bottom of Browns Gulch and its tributaries has altered the landscape so it no longer appears the same as it would have about 1870. The ephemeral structures associated with this period have vanished.

[1030]Mineral Survey Records, MS760. Bureau of Land Management. Butte.
[1031]Mining and Engineering World. Vol. 35, P. 817, Oct. 21, 1911.
[1032]Montana Pay Dirt, A Guide to the Mining Camps of the Treasure State. by Muriel Sibell Wolle. Sage Books, Denver. p.44
[1033]Ibid.
[1034]Ibid.
[1035]"Report of the Inspector of Mines and Deputy Inspector of Mines for the year ending Nov. 30th, 1890". G.C. Swallow, Inspector, J.B. Trevapthen and Jacob Oliver, Deputy Inspectors. Report on file at the Montana College of Mineral Science and Technology. Butte. p. 50.

Early Mill Sites

No early mill sites were observed in the reconnaissance of Browns Gulch. However, an informant indicated that some ore from this area was processed at a facility on Alder Gulch, located near the mouth of Granite Creek about a mile and a half northwest of Nevada City. This mill was near another little mining community, Junction, and was sometimes called the "Junction Mill".[1036]

The Easton and Pacific lode groups were located in the 1880s and 1890s and surveyed between September and November 1894 for Henry Elling.[1037] At that time, Elling had two mill sites surveyed at the mouth of Granite Creek on Alder Gulch, the Easton Mill Site and the American Mill Site. The Mineral Survey Plat shows a mill here at the time of the survey.

These lode groups were developed by Elling between 1890 and 1900 and are sometimes referenced in the literature as separate properties but are often simply called the Easton-Pacific. Apparently, Elling leased an existing mill at the mouth of Granite Creek in 1892 to process ore from his claims near the head of Browns Gulch.[1038] He later shifted the ore concentration operation to the claim groups by erecting a 10 stamp mill capable
of processing 30 tons a day on the Easton group.[1039] A cyanide plant was added to the operation in 1902 to treat the mill tailings.[1040] A steam plant initially supplied power with a conversion to electricity when the latter became available before 1912.[1041]

In 1900 there were 35 men working at the Easton and 6 miners at the Pacific, the latter claim group at that time was "new and promising".[1042] The labor force was transferred between the two claim groups, depending on the emphasis in development. Total employment in 1906 was 43 and by 1912, 60 men were working the claims.

Mining was discontinued on the Easton-Pacific about 1915 and the Elling Estate was reported to have sold these properties to "eastern interests" in 1929.[1043] Several publications in the 1930s state that the Easton-Pacific was then the most important quartz property in the area with production between 1902 and 1935 totaling 22,091 oz. of gold and 759,148 oz. of silver.[1044]

[1036]Information from Bill Babcock, Virginia City.
[1037]Mineral Survey Records. Bureau of Land Management. Butte.
[1038]Information from Bill Babcock, Virginia City.
[1039]"Twelfth Annual Report of the Inspector of Mines of the State of Montana". John Byrne, Inspector and Frank Hunter, Deputy Inspector. Dec. 1, 1900. pp. 23-24.
[1040]"Fourteenth Annual Report of the Inspector of Mines of the State of Montana." John Byrne, Inspector and John J. Barry, Deputy Inspector. Dec. 1, 1902. pp. 56-57.
[1041]"Biennial Report of the Inspector of Mines of the State of Montana for the Years 1911-1912.11 William Walsh, Inspector and William Oren, Deputy Inspector. Dec. 1, 1912. p.94.
[1042]Ibid.
[1043]Mining Truth Vol. 13-14, p. 23. Nov. 19, 1929.
[1044]"A Geological Reconnaissance of the Tobacco Root Mountains" Montana Bureau of Mines and Geology Memoir No. 9. by Wilfred Tansley, Paul A. Schafer, and Lyman H. Hart. June, 1933. p.48.

Mine near the Bonanza Mill Site is located just south of the Bonanza Mill in Mill Gulch, one of the Easton group claims surveyed for Henry Elling in 1894.[1045] Little information was found on the site, no doubt because it is associated with unpatented mining claims about which there is little record. One reference, possibly describing this site, is quoted below:

A small mill is being erected on a group of claims, including the Bonanza, at the head of Mill Creek near Virginia City, Montana by the Sheridan Gold Mining Co. This property embraces 30 claims. W. H. Brinton is in charge.[1046]

Hungry Hollow is a tributary of Alder Gulch that courses between the latter drainage and Browns Gulch to the west. Presumably, Hungry Hollow Mining District experienced the same sequence of mining development as the larger drainages surrounding it. However, little documentary information was found on the district and there is no evidence to suggest the area was significant in the early free-milling lode mining period.

A key resource identified for the district is the Highup group of claims near the head of the gulch.[1047]

Most of the claims in Hungry Hollow belong to a single group, the Highup. They were surveyed for E. W. Merritt and W. J. Bates in July and August 1913. At that time, improvements included four discovery shafts, a discovery tunnel, four tunnels, three drifts, a shaft and two crosscuts, a house and shop.[1048]

Merritt was reported to have opened a. 600-foot tunnel on the property in 1910 that was closed "pending erecting a concentrating plant for reduction of ore".[1049] By 1912 Merritt was acting superintendent of an operation which opened 1100 feet of tunnel. Again, the mine was reported closed temporarily, pending construction of a mill.[1050]

One final bit of documentary information found for this report comes from a 1937 journal article. At that time, Walter K. Mallette and S.F. Mallette of Spokane were retimbering old tunnels and "extending into known shoots for testing". These developers anticipated installing new milling equipment if their exploratory work proved successful.[1051]

BACKGROUND HISTORY- SILVER STAR DISTRICT
By: GCM

[1045]Mineral Survey Records. Bureau of Land Management. Butte.
[1046]Mining Journal Vol. 20, p. 21, July 30, 1936.
[1047]Information from Bill Babcock of Virginia City.
[1048]Mineral Survey Records. Bureau of Land Management. Butte
[1049]"Biennial Report of the Inspector of Mines of the State of Montana for the Years 1909-10". by William Walsh, Inspector and William Orem, Deputy Inspector. Dec. 1, 1910. p.103.
[1050]"Biennial Report of the Inspector of Mines of the State of Montana for the Years 1911-1912.11 by William Walsh, Inspector and William Orem, Deputy Inspector. Dec. 1, 19.12. p. 90.
[1051]Mining Journal Vol. 21, p.28, July, 30, 1937.

The Silver Star mining district, although small, was one of die richest in Madison County during the late nineteenth century and was one of the oldest quartz mining districts in the state. After the initial gold rush in Virginia City ended, prospectors fanned out into the surrounding territory. Green Campbell found the first gold deposits in the Silver Star area in 1866. By 1870 Campbell had developed his property to a point where it was known as one of the most valuable quartz mines in the county. It was also reported to have been the first quartz claim to be granted a patent in Montana.[1052]

Other quartz lodes were soon located and major mining operations, such as the Broadway, the Hudson Group and the Iron Rod, went into production along with the Green Campbell. Smaller operations such as, the Everett, Clipper, Glenns Falls, Pinchbeck, Nugget, Moming Star, Bedford and others were active in the period prior to 187 1. Within a short time there were two booming mining camps on the banks of the Jefferson River. Soon after, local residents, miners and prospectors met at the general merchandise store and voted to name one camp Silver Star after the nearby Silver Star mine of Bill and George Boyer. The other smaller camp, located up river about dime miles, they named Ragtown. Later the name was changed to Iron Rod after the iron rods on a new bridge, which had been built across the river. Up to that point the community consisted of dwelling on both sides of the river connected by a swinging footbridge. Silver Star acquired a post office in June 1869 and for the next few years was the only major town between Virginia City and Helena. The town in 1872 was described by M. A. Leeson as "...pleasantly situated [with] quartz mills, stores, hotel, school-house, Masonic hall, temperance lodge, and many nice private residences. Its population numbers two hundred and fifty." Silver Star remained the areas leading trading center until supplanted by Whitehall in the late 1880s.[1053]

To process the ore from the mines a number of mills were constructed throughout the district during the 1860s. The Everett 10-stamp, steam-operated mill at Silver Star treated ore from the Green Campbell. An amalgamation process was used and yielded from $17 to $30 per ton. Ore from the Iron Rod mine was treated at the Stevens and Trivitt 12-stamp mill while the Tripp and Ainslee mill, built on the banks of the Jefferson River between Silver Star and Iron Rod, processed ore from the Morning Star, Bedford and other of the smaller mines. A six-stamp mill and an arrastra were constructed at Hell. Canyon during 1876 following new discoveries in the canyon. The largest mill was built at the Broadway mine after it was purchased by a London company. The 40-stamp mill was built in 1881 but only ran for three months before shutting down after the process used proved to be a failure. Recovery rates, in general, were not very high. Even a 20-stamp mill built by F. R. Merk in 1900 which used an amalgamation and cyanidation process recovered only 66 percent of the gold from the ores. Later many of these old tailings dumps were profitably reworked.[1054]

[1052]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.

[1053]Leeson, M. A., 1894. History of Montana Lewis Publishing Company, Chicago.

[1054]Sahinen, Uuno M., 1939. Geology and Orr, Deposits of the Rochester and Adjacent Mining Districts, Madison County, Montana, Montana Bureau of Mines and Geology Memoir No. 19. Montana School of Mines, Butte.

The Silver Star district saw a decline in mining activity during the 1870s because of the lack of skilled labor, railroad transport, and the high cost of all labor and supplies. In 1883 the Northern Pacific Railroad reached Whitehall which eased transportation costs and sparked a new interest in the area. Eventually, in 1898, a branch line was built from Whitehall to Twin Bridges. While short interruptions stopped production from time to time, the district operated almost continuously from the late 1860s to around 1910. In 1910 the area began to decline because of the exhaustion of the high-grade ore, problems with water in the lower levels of the mines, inefficient milling methods, and the low prices for metals. A few companies, however, did continued to operate through the 1920s and 1930s. Most mining activities in the district ceased during World War II and were not resumed when the war ended. Some production did resume at the Broadway and Green Campbell but it never approached pre-war levels.[1055]

One mining operation in the district, which did operate during World War II, was a small chrome mine located about two and one half miles west of Silver Star. Owned by the Silver Star Chrome Company, the mine employed about 20 men who mined 200 tons of chromite ore daily. Ore was processed in the Iron Rod Mill on Highway 41 near Silver Star. The operation ran from 1940 until 1944 since the government classed chrome as vital to the war effort.[1056]

The total value of ore taken from the Silver Star district has been estimated at about two and three-quarter million dollars. Virtually all the production came from quartz lodes - among the first to be developed in the Montana territory. The quartz lodes have all produced free milling gold ore with many hundreds of feet of the veins apparently eroded away; yet, almost no placer gold has ever been found in the district, a fact that continues to puzzle geologists. Thus, unlike most other early mining districts in the territory which started as placer operations, the Silver Star district, from its inception, was solely a quartz lode district. About 75 percent of the district's production came during a short period from the late 1860s to the early 1880s, with a majority of that production coming from one mine - the Broadway.[1057]

SILVER STAR MINE HISTORIES

The Agalia was located on February 29, 1888 by the Iron Rod Mining Company and appears to have been a small prospecting operation. It may have been an attempt by the company to locate new ore veins since the upper workings of the Iron Rod mine, located about half a mile to the east, was stoped out. There is no record of any production coming from the operation[1058]

[1055]McMillan, Donald T., 1939. Geology and Ore Deposits of the Contact Area at Silver Star, Montana. Unpublished thesis, Montana School of Mines, Butte.

[1056]Trauerman, Carl J. and Millard L. Reyner, 1950. Directory of Montana Mining Properties 1949, Montana Bureau of Mines and Geology Memoir No. 3 1. Montana School of Mines, Butte.

[1057]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.

[1058]GLO mineral survey records, survey map for claim No. 3827.

Ajax

Samuel Hayden, Charles Dahler, and P.A. Largey first claimed the mine in January of 1878 and was originally included in the Hudson group of claims which were located southwest of the Broadway mine. The small mine was worked from 1900 to 1934, during which time an estimated $15,000 worth of gold and some silver was recovered.[1059]

Aurora

Charles Heineman as the Aurora and Borealis claims located three miles west of Silver Star first claimed the property on April 9, 1877. The mine consisted of several tunnels, with the upper one at 6020 feet, and the lower one at 5750 feet above sea-level. Fritzsche (1935) described the mine as the best in the area in 1876, except for the Green Campbell, which was closed down at the time. The mine was worked intermittently, on a small-scale, from 1875 to 1940 as a silver mine. When it closed, the ground above the upper tunnel was entirely stoped out. Approximately $80,000 worth of ore was taken from the mine. At the time of its closing the mine was owned by J. R. Dullea of Silver Star. The mine reopened after World War II for a brief period from 1946 to 1949 and had only a limited amount of production. In the 1970s the property was acquired by the Blue Jay Mining Company but mining operations were not resumed.[1060]

Baccharat

This small gold mine was located on December 7, 1891 and claimed by P. A. Largey. The mine appears to one of a group of small mines, which operated during the district's first decade. These mines worked small but rich pockets of ore, which were quickly depleted, forcing an early closure of the mines.[1061]

Broadway/Victoria

Two miles west of Silver Star, Colonel N. F. Sanders, George F. Pate, N. N. Morris, F. R. Merk and others developed the Broadway mine around 1868. The ore was easily mined and crushed and contained from $10 to $14 per ton of free gold. By 1881 it had produced $500,000 in gold and such rich profits were made from the mine's shallow workings (only about 75 to 200-feet below the surface) that a group of English investors purchased the property, along with the Mutual Agreement mine, for $225,000. In 1882 the company called the Broadway Gold Mining Company, Ltd., of London - built a 40-stamp amalga firmon mill on the Jefferson River and a two-mile tramway to

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[1059]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1060]Ibid.
[1061]Ibid.

transport ore from the mine to the mill. The English firm invested half a million dollars in the project and hired J. W. Plummer to run the mill. But the new British amalgamation process used to extract gold from the ore proved to be a failure and by June 1882, after operating for only three months, the mill was forced to shut down.[1062]

The claim was never patented and the English company could not legally hold title to it so one of the original owners, F. R. Merk, jumped the claim and relocated it as the Bowery claim. Merk then built a mill on Cherry Creek and another just south of Silver Star to process the ore. The mill was equipped with a 70-horsepower boiler and a 20-horsepower hoist. A large Knowles sinking pump, with à 150 to 500 gallons per minute capacity, kept the mine workings dry. Since the amalgamation process did not work wen, only free milling ore was mined until 1900 when Merk built a 20-stamp mill and cyanidation plant. After working considerable amounts of ore, the mill and plant burned down in 1902.[1063]

From this point on, the mining activity has been limited to small leasing operations on small ore shoots above the water level. Recovered ore was then treated at the Hudson Mine's 15-stamp cyanidation mill. The mine was owned by the Broadway Gold Mining Co. of Butte, Montana and then was acquired by the Monidah Trust Company of Butte which, in 1935, leased the property to H. H. Gordon of Silver Star. Gordon employed three men in development work and reported the workings consisted of two shafts, a 1100-ft adit and a 100-ft winze.[1064]

In 1936 the mine was bought by the Knapp Taylor Nelson Company and the property's name was changed to the Victoria Mines. Along with the Victoria claim [granted to John D. Thomas, Isaac S. Stafford, Joseph J. Bayer and George E. Stafford on April 7, 1877] the new company acquired the Maryland, Delaware and American claims and built a 100-ton mill and cyanide plant. The mill processed from 2000 to 3000 tons or ore per month from deposits taken from the Broadway and Victoria mines and from a pit on the American claim. The concentrates were retorted at the mine and the gold bars were then shipped to the U. S. Mint. Old tailings from the 1900-1902 operation were also treated in the mill but sulfide ore from the Broadway No. 9 level had to be shipped to Anaconda for treatment.[1065]

Production continued through the late 1930s and by 1940 the mine employed 35 to 40 men and was equipped with an electric hoist and an electric-powered tramway. The operation was shut down during World War II when gold mining was banned by the government as non-essential. Production resumed at the Victoria in 1949 and the company reported it was producing from 100 to 120 ton of ore per day from the 900-ft level and from an open pit operation. The ore was milled to produce copper-gold

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[1062]Cope, George F., 1888. Statistical and Descriptive Report Upon the Mines of Madison Co., Montana. Typed copy made at the Montana School of Mines, Butte, 1936.
[1063]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1064]Ibid.
[1065]Ibid.

concentrates and the mine continued to produce until 1953 when it was shut down. It was then acquired by John T. Potts but was not reopened.[1066]

The mine was the richest property in the district, being responsible for almost half of the district's entire production. An estimated $1,050,000 in gold and smaller amounts of silver and other metals came from the mine during its long and productive life-span.[1067]

Bu11dog

This small mining operation was located on unpatented ground and appears to have been a prospecting operation. In 1931 the claim was acquired by the Golden Rod Mining Company which was attempting to reopen the original Iron Rod mine workings, located about half a mile to the northeast, and this operation may have been part of that effort. No record of any production from the operation has been reported.[1068]

Chromite

The Silver Star Chrome Company's mine located about two and one half miles west of Silver Star was one of the few non-gold mines in the district. It was also one of the few mines in the district that operated during World War II when gold mines were shut down. Chrome was vital to the war industry so the mine operated from 1940 to 1944, producing a high-grade chromite ore. Some 200 tons per day was mined and processed in the Iron Rod gravity concentration mill located along Montana Highway 41 near Silver Star. The company employed twenty men. The mine workings consisted of 2000 ft of drifts, crosscuts and raises in addition to a small open-pit operation. No mining on the property has occurred since 1944.[1069]

Clancy

The Clancy mine was described in the 1959 Directory of Montana mines as a small copper, gold and silver mine, which was producing and developing with three employees.[1070] The operator was B. J. Rybin of Silver Star. The operation, apparently shut down shortly after, however, for the 1961 directory does not indicate the mine was still producing. The early history of the mine probably goes back to the nineteenth century but no records were located which would indicate when the mine was in production.[1071]

[1066]Ibid.
[1067]Ibid.
[1068]GLO mineral survey records, mineral claims plat map No. 5624.
[1069]Trauerman, Carl J. and Millard L. Reyner, 1950. Directory of Montana Mining Properties 1949, Montana Bureau of Mines and Geology Memoir No. 3 1. Montana School of Mines, Butte.
[1070]Crowley, Frank A., 1960. Directory of Known Mining Enterprises, 1959, Montana Bureau of Mines and Geology Bulletin 14. Montana School of Mines, Butte.
1961 Directory of Known Mining Enterprises, 1961, Montana Bureau of Mines and Geology Bulletin 25. Montana School of Mines, Butte.
[1071]Ibid.

Clifford

Wheal Clifford, William Pascoe and Daniel Bowker [or Bowlar] established the claim for the Clifford mine in 1900. At that time the mine consisted of a discovery shaft, three shafts and two tunnels. No records were located which showed any significant production after 1900.[1072]

Clipper

Fritzsche lists the Clipper mine with a group of small mines, such as the Glenns Falls, Queen of the West, Flintlock, Tolin, Nugget and Pinchbeck, which were active prior to 1871 but had little significant production after this period. The Clipper, however, apparently was reopened or continued in production since an article in the Madison County Monitor of October 26, 1895 mentions the Clipper as one of a number of mines in the district which were in good running order.[1073] No records of any production following this period were available. Patrick A. Largey and Charles L. Dahler patented the property in January of 1877.[1074]

Crickett

George W. Blackman located the mine on September 14, 1880. When the mine was surveyed in August of 1888, it had six tunnels, six shafts and a cabin. Recovered ore was shipped to the Hudson mine's 15-stamp amalgamation mill. It does not appear the mine produced any significant amount of ore following this period.[1075]

Galena

The Galena was located in 1887 by William Owsley. At that time two discovery shafts, two tunnels, four shafts with a steam hoist, and a quartz mill were located on the site. The mine is described by Fritzsche (1935) as one of a group of mines which worked rich but small pockets of ore before the turn of the century. No information on the mine's operation or production figures was available and most of the mine workings had caved-in. Lessees did attempt to reopen the workings in the mid-1930s but there are no reports of any significant production from the mine.[1076]

Glenns Falls

[1072]GLO mineral survey records, survey map for claim No. 5981.
[1073]Madison County History Association, 1976. Pioneer Tails and Trials: Madison County 1863-1920. Blue Print & Letter Company, Great Falls.
[1074]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1075]GLO mineral survey records, survey map for claim No. 2344.
[1076]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.

The Glenns Falls mine was one of a number of small operations including the Clipper, Pinchbeck, Queen of the West, Flint-lock, Tolin, and Nugget which operated in the vicinity of the Iron Rod mine. The mine was worked before 1871 but was of no importance later. P. A. Largey and C. L. Dahler claimed the property during this period.[1077]

Golden Rod

The Golden Rod Mining Company of Twin Bridges and Spokane was the owner of the old Iron Rod mine during the 1930s. In 1934 the company attempted to reopen the old Iron Rod mine workings which by this time had become inaccessible. A 2000 foot-long tunnel was driven from a point southeast of the original Iron Rod mine to a level 200-ft below the old Iron Rod workings. The company was in operation until 1942 when a wartime order closing down gold mines was put into effect. The mine was never reopened. The company reported that during this period some $300,000, chiefly in gold, was taken from the mine.[1078]

Green Campbell

Green Campbell first located the quartz lode which bares his name in 1867 and it became the first quartz lode patented in the Montana Territory. The mine first went into production that same year and for a few years it was the best known lode mine in Montana. It was operated intermittently from 1867 to 1918 with its period of greatest productivity in the period prior to 1881. During this early period, the mine was worked from two shafts and a tunnel with drifts about 700 feet of drifts. The mine workings were relatively shallow, extending only about 200 feet below the surface. The mine had its own stamp mill but in 1873 the mine was closed for lack of skilled labor, railroad transport and the high price of all labor and supplies. In 1904 the mill was refitted to be used as a custom mill for other lodes. The operation was one of the first electric-powered mills in the area. By 1907 a 100-ton concentrator and a 25-ton Huntington mill with plate amalgamation were in operation. The mine was closed in 1918 and for many years the working were inaccessible.[1079]

In 1935 the property was owned by Bassette C. Leyson of Neihart, Montana and by E. O. Face, of Lincoln, Nebraska. The mine was not in operation but was reported to have on the surface a hoist, cabins, an assay office and a partly wrecked mine. From 1938 to 1942 the mine (now owned by the Green Campbell Mining Company) was reported as back in operation with 20 men employed in development work at the 300-ft level and in production of approximately 25 tons of ore per day. As were all the country's gold mines, the Green Campbell was closed down in 1942 by a government order which banned non-essential industry. After the war the property was owned by W. C. Geibel

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[1077]GLO mineral survey records, survey map for claim No. 478.

[1078]Gilbert, F. C., 1935. Directory of Montana Mining Properties, Montana Bureau of Miners and Geology Memoir No. 15. Montana School of Mines, Butte.

[1079]Cope, George F., 1888. Statistical and Descriptive Report Upon the Mines of Madison Co., Montana. Typed copy made at the Montana School of Mines, Butte, 1936.

and J. H. Patterson of Silver Star but was not put back into production. In 1970 to 1972 the mine, under the operation of United Investors Corporation of Salt Lake City, engaged in some development work and a small amount of production. By the mid-1970s the property was owned by the Patrick Harrison Mining Corporation but no further mining has occurred.[1080]

Accurate records on the production figures of the Green Campbell are not available and estimate on the total production range from about $400,000 to over $1,000,000. The claim of George Cope (1888) that the mine by 1888 had produced over a million dollars worth of ore is undoubtedly exaggerated. Sahinen (1939) and Fritzsche (1935) make more conservative estimates that the mine produced about $270,000 in ore prior to 1881 and about $400,000 overall. Krohn and Atheist (1977) state the mine produced an estimated 20,000 ounces of gold. The greater part of this production occurred during a few years between 1867 and 1881. As was often the case, the Green Campbell had a brief bonanza period followed by long periods of sporadic, relatively small-scale production.

Iron Rod

Along with the Green Campbell and the Broadway, the Iron Rod was one of the first quartz lodes located in the Silver Star district. The lode was discovered in the mid 1860s and was one of the first in the district and was worked for gold. Initially, the ore was hauled to a mill up Hells Canyon, located about two miles south of the mine. In the late 1870s a Stevens and Trivitt 12-stamp amalgamation mill was built close to the mine on the Jefferson River. The mill recovered about 70 percent of the gold from the ores which yielded from $25 to $100 worth of gold per ton. By 1888 the mine had reached a depth of 600 ft with the upper levels stoped out.[1081]

The mine was in operation almost continuously until 1913, at which point it was shut down and the mine workings became inaccessible. At this point the mine has been estimated to have produced about $660,000. Perhaps $500,000 of this figure came from the period from 1868 to 1887 with an additional $160,000 being produced from 1888 to 1913. Most of the mine's production was gold with minor amounts of silver and lead.[1082]

During 1934 and 1935 the mine's workings were opened via a 2000-ft adit which was driven by the Golden Rod Mining Company of Twin Bridges and Spokane. The mine was briefly put back into production and had shipped $220,000 worth of ore by 1940. The operation was shut down during World War II and was never reopened.[1083]

[1080]Gilbert, F. C., 1935. Directory of Montana Mining Properties, Montana Bureau of Miners and Geology Memoir No. 15. Montana School of Mines, Butte.

[1081]Cope, George F., 1888. Statistical and Descriptive Report Upon the Mines of Madison Co., Montana. Typed copy made at the Montana School of Mines, Butte, 1936.

[1082]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.

[1083]Gilbert, F. C., 1935. Directory of Montana Mining Properties, Montana Bureau of Miners and Geology Memoir No. 15. Montana School of Mines, Butte.

Iron Rod Extension

The Iron Rod Extension appears to have been a prospect operation to locate new veins of ore for the Iron Rod mine located a quarter of a mile to the east. The claim was located on December 12, 1884 by George Farwell and was surveyed in 1885. At that time it had one discovery shaft, and three shafts. There are no records of any significant production from the mine.[1084]

Keystone

Frank Reid and others claimed the mine on January 3,1898 but it had probably been mined for some time prior to this date.[1085] The work was described as a vertical shaft down to the second level and then an inclined shaft from the second to the third and bottom level at 200 ft. below the surface. A long adit from the North Slope of Tom Benton Gulch was driven to the first level. No records were available on the early production. Fritzsche lists the Keystone as one of a group of small mines, which operated briefly during the 1880s and 1890s in small but rich pockets of ore in this area.[1086] Fritzsche reported the mine had been reopened by a contact group during the early 1930s but that a large sulphide body of ore had been encountered at a shallow depth which was not profitable to mine.[1087]

Locust

This small mining operation was located on unpatented ground and no record was available giving a description of the mine or of any production figures. The mine may have been one of a group of small mines, which briefly operated during the 1860s and 1870s on small but rich deposits throughout the area of the Iron Rod mine.[1088]

Moonlight

Fritzsche describes the Moonlight as one of a group of small mines, which worked small but rich pockets of ore during the district's first two decades. The mines were reported to have closed down before the turn of the century and no production figures were available.[1089]

The Moonlight, however, apparently was reopened since it was patented in 1902 by the Moonlight Mining Company and by 1905 it was in full production. It was one of

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[1084]GLO mineral survey records, survey map for claim No. 1599.
[1085]McMillan, Donald T., 1939. Geology and Ore Deposits of the Contact Area at Silver Star, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1086]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1087]GLO mineral survey records, survey map for claim No. 9148.
[1088]GLO mineral survey records, mineral claims plat map No. 5624.
[1089]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.

several small mines in the area, which produced about 1000 tons of ore worth $34.05 per ton in 1909.[1090]

Sample Orr

This mine was patented by Patrick A. Largey on October 1877 and was one of the Hudson group of claims. At that time the mine consisted of five shafts, three dog holes, and one tunnel. The mine was worked intermittently from 1900 to 1934. Fritzsche reported the mine had some remarkably rich pockets of ore but the total amount of ore taken from the mine was not significant.[1091]

Silver Star

Elmer Johnson, John Hudson and Fredrick Merk claimed the Silver Star mine on January 1, 1879.[1092] However, the property was apparently mined during the previous decade. The town of Silver Star was named after the Silver Star mine which at that time was run by George and Bill Boyer.[1093] Fritzsche mentions the Silver Star as one of a number of the district's early mines, for which there were no records, but which mined rich, small deposits of ore.[1094]

Golden Spike/Stella

William, Richard and James Pascoe patented the property on which the mine is located on January 26, 1892. At that time the operation consisted of a discovery shaft, another shaft and a tunnel.[1095] Fritzsche reported the mine was one of a number of early operations which worked small, rich deposits of ore. No records on the mine's production were available and the workings were reported to have been caved-in. The mine was reported to have produced about $50,000 worth of ore previously although Fritzsche says this was probably much too high an estimate.[1096]

In the 1930s the mine was owned by Ben Yarbrough and Joe LeSage of Silver Star. Ed Lahey of Butte leased the property - renamed the Stella - and employed eight miners to reopen the collapsed workings. The plant consisted of a steam hoist, pump, fan and electric light equipment, logging outfit, blacksmith shop and boarding house. The mine consisted of a 320-ft shaft and two drifts, 100 and 140-ft long. A pocket of high-grade ore had been discovered and owners reported a shipment of six tons of $112.50 per-ton ore from the shaft-sinking operation. However, according to Fritzsche, before profitable production could resume, an 800-ft tunnel to drain the mine was needed. This was

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[1090]GLO mineral survey records, survey map for claim No. 8944.
[1091]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1092]GLO mineral survey records, survey map for claim No. 3904.
[1093]Cheney, Roberta Carkeek, 1983. Names of the Face of Montana. Mountain Press Publishing Company, Missoula.
[1094]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.
[1095]GLO mineral survey records, survey map for claim No. 6143.
[1096]Fritzsche, Hans, 1935. Geology and Ore Deposits of the Silver Star Mining District, Madison County, Montana. Unpublished thesis, Montana School of Mines, Butte.

apparently not completed since the mine was shut down again in 1938. A year later the mine was owned by the Mammoth Mines Corporation of Twin Bridges and Seattle, and work resumed on the tunnel, now 1225-ft in length, which would tap into veins at the old workings. Surface facilities now included a 1800 cubic-ft compressor, electric locomotive and electric powerings. Surface facilities now included a 1800 cubic-ft compressor, electric locomotive and electric power from the Montana Power Company. 'Me equipment for a 100-ton flotation plant was at the mine but had not been set up. Although the company announced it expected to resume full operations in 1940, World War 11 probably ended these plans since there is no record of further production from the property. In the 1970s Securus Energy Ltd. of Calgary owned the property.[1097]

Historical Background of Mines in Madison County
By: Western History Research

Placer mining began in the Tobacco Root Mountains in 1863 and extended through the 1930s. Although the placer period lasted for nearly eight decades it experienced numerous fluctuations. The first wave of placer mining extended from the discovery of Alder Gulch in 1863 to the late 1860s. Once the initial rush period had subsided large amounts of capital were required to build the ditches necessary for hydraulic mining and the dredges which chewed the streambeds. Hydraulic mining was practiced extensively beginning in the 1870s. By the close of the nineteenth century the hydraulic mining had run its course. The dredge period began in the mid-1890s and extended into the 1940s.[1098]

Placer mining, however, was not the only way to recover gold. Almost as soon as the placer gold was discovered some miners turned their attention to lode mining. This interest in quartz mining was in part stimulated by the seasonal nature of placer mining. Geologist Rossiter Raymond noted in 1869 that "During the winter season placer mining is impossible, or at best the miner can only hoist the pay gravel to the surface, so as to be ready for the spring washing. . . . This state of affairs conduces greatly to the advantage of the quartz claims and good miners are readily attainable. [and] Prudent managers often extract, during the winter, ore in sufficient quantity to keep their mills employed far into the summer, so that the major portion of the hands may, with the opening spring, be released to work in the placers".[1099]

Geologist Alexander Winchell noted that "Even during the sixties, the first decade of mining in the State, some little progress was made in opening 'deep mines' or 'quartz mines,' among the first of which were the Green Campbell, Broadway, and Iron Rod, at Silver Star; [and] the Noble, on Wisconsin Creek north of Sheridan (opened in 1864) . . ." Winchell goes on to remark that "Only the richest ore could be treated at a profit at this early date on account of the extremely high cost of labor and supplies, which were

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[1097]Ibid.

[1098]Levandowski, S.H., 1956. "Geology and Mineral Deposits of the Sheridan-Alder Area, Madison County, Montana." Ph.D. thesis, University of Michigan, Ann Arbor., p. 198.

[1099]Raymond, Rossiter W., 1869. The Mines of the West: A Report to the Secretary of the Treasury. J.B. Ford and Company, New York., p. 140.

brought in by wagon train, at first from Pikes Peak, Colo., and later from Corinne, Utah".[1100]

Although the problems with getting the heavy equipment needed for milling the ores were formidable, many early gold milling operations were started. In 1864 a ten-stamp mill was built on Wisconsin Creek to process ores being recovered in that area.[1101] By the end of the decade, 1869, as many as seven mills had been constructed in the vicinity of Norris, others were constructed at Pony, Virginia City and various gulches around the Tobacco Root Mountains.[1102] To a great extent these early gold milling operations were the result of "the enlistment of home capital" and, unfortunately, many were poorly designed. To compound the problem in the early period, Raymond reported in 1869 that "through lack of systematic development, the mines have not generally furnished ore in sufficient quantity to keep the mills continually supplied".[1103] The slow start of the lode mining phase was due in part to the lack of capital, the need for heavy equipment, improved transportation, the dominance of the placer mining, and to the financial panic of the 1870s. However, the importance of the deep mines was not to be denied and the prospecting work of the 1870s resulted in the location of most major metals deposits in the Tobacco Root Mountains. Once lode mining, or hard rock mining, was started there Was a gradual increase in the importance of this phase of mining.[1104]

Lode mining was most active in the Tobacco Roots from 1870 to roughly 1900 (Lorain 1937:5). The discoveries of the prospecting phase carried on during the 1870s, came to be the producing lodes in the 1880s. This resurgence in mining was stimulated, in part, by a recovering national economy and vastly improved transportation network. By 1880 the Utah and Northern Railway had extended north from Corrine, Utah to Dillon, Montana and was soon completed to Butte. In 1883 the Northern Pacific Tobacco Root Mountains Railroad stretched across Montana from its eastern to its western borders, passing near the northern edge of the Tobacco Root Mountains. These rail links provided the stimulus that hard rock mining had needed and the decade from 1880 to 1890 was a period of rapid development and successful operation of mines in all parts of the State" (Winchell 1914:20). From 1890 to 1900 mines in the Tobacco Root region were generally successful.[1105]

By the turn of the century, however, many of the -mines had exhausted the upper portions of the ore bodies. Further development of - these mines required extending them to depths that required pumping water that began to flood the mines. Geologist S. H. Lorain reported that "the high cost of fuel and the inefficient equipment available, increased costs to the point where operation [of the deep mines in the Tobacco Roots

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[1100]Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 20.

[1101]Tansley, Wilfred, Schafer, P.A. and Hart, L.H., 1933. "A Geological Reconnaissance of the Tobacco Root Mountains, Madison County, Montana." Montana Bureau of Mines and Geology Memoir 9., p. 4.

[1102]Raymond, Rossiter W., 1869. The Mines of the West: A Report to the Secretary of the Treasury. J.B. Ford and Company, New York., p. 150.

[1103]Ibid., p. 146.

[1104]Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 20.

[1105]Tansley, Wilfred, Schafer, P.A. and Hart, L.H., 1933. "A Geological Reconnaissance of the Tobacco Root Mountains, Madison County, Montana." Montana Bureau of Mines and Geology Memoir 9., p. 4.

Mountains] was no longer possible". Lorain continued, "Although some mines have produced more or less consistently on a small scale since their discovery, mining has been spasmodic in the region since 1900. Each major business depression has been followed or accompanied by some revival. . . [but] With these exceptions the region has been comparatively quiescent since the early days of intense activity".[1106]

The relative importance of the lode mining is indicated by production of the various metals from the 1860s to the early 1930s which is estimated at a value of $16,500,000. This is approximately 23% of total production for the Tobacco Root area, estimated in 1933 to be nearly $70,000,000.[1107] Although the primary metal recovered in the area is gold, other metals produced as a byproduct of the hard rock mining include silver, copper, lead, and zinc.[1108] In some cases mines were developed primarily as silver mines and in other cases significant quantities of copper and lead were recovered.

Mining Districts In the Tobacco Roots

From the beginning of the placer mining period in the 1860s and extending into the lode mining phase before and after the turn of the century, mining activities have been identified in terms of mining districts. A district is, essentially, a clustering of placer or lode mines within a specific geographic area. The districts were created, in part, as a method for establishing local rules within a particular mining area. Government and courts upheld this process of creating mining districts and the acceptance of miner's codes.[1109]

Initially in the Tobacco Root Mountains area, most of the creeks, which were actively mined, were each considered an individual district. Eventually, as larger areas were organized around mills, the identity of the districts changed. Often more than one name has been used for a particular district. And from one published report to another the boundaries of the various districts are seen to shift slightly in one direction or another. It is not uncommon to find the literature on the mines of the Tobacco Roots lumping the production statistics of more than one district together. All of this creates a rather confused picture of the mining districts and, at best only a rough estimate of metals production.

In 1933 geologist Lyman H. Hart noted that 'For the purposes of correlation and discussion the ore deposits of the major portion of the Tobacco Root Mountain area are divided into five regions: Pony, Twin Bridges, Sheridan, Virginia City and Norris".[1110] Other authors have separated out other districts including the Renova district at the northern extreme of the mountains and the Washington district on the interior of the

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[1106]Lorain, S.H., 1937. "Gold Lode Mining in the Tobacco Root Mountains, Madison County, Montana." U.S. Montana Bureau of Mines Information Circular 6., p. 5.

[1107]Hart, L.H., 1933. "Ore Deposits" In, "A Geological Reconnaissance of the Tobacco Root Mountains, Madison County, Montana." Montana Bureau of Mines and Geology Memoir 9., p. 33.

[1108]Lorain, S.H., 1937. "Gold Lode Mining in the Tobacco Root Mountains, Madison County, Montana." U.S. Montana Bureau of Mines Information Circular 6., p. 6.

[1109]Paul, Rodman Wilson, 1963. Mining Frontiers of the Far West, 1848-1880. Holt, Rinehart and Winston, New York., p. 169.

[1110]Hart, L.H., 1933. "Ore Deposits" In, "A Geological Reconnaissance of the Tobacco Root Mountains, Madison County, Montana." Montana Bureau of Mines and Geology Memoir 9., p. 23.

southeastern flank, Potosi Hot Springs district on the interior of the eastern slope, and the Iron Rod district at the northwestern end of the mountain range.

Sheridan District

The Sheridan district covers a large area, approximately nine and a half miles wide (east-west) and thirteen and a half miles long, along the southwestern flank of the Tobacco Root Mountains. Its eastern boundary is the main ridge of the mountain range. Bivens Creek is the southern boundary and the Wisconsin Creek drainage forms the northern boundary.[1111] To the west the mountains abruptly end at the alluvial fan located -east and north of the town of Sheridan forming the western edge of the district. The topography is rugged mountain terrain with steeply cut canyon-like stream valleys. Major creek drainages in the Sheridan district include Wisconsin Creek, Indian Creek, Mill Creek, Ramshorn Creek, and Bivens Creek. The Virginia City district is located immediately south, beginning with California Creek. Tidal Wave district, starting at Wet Georgia Gulch, is immediately north of the Sheridan district.

Three mining communities were identified as being associated with the Sheridan district. Two of these, Lakeshore and Leiterville, were identified as "company towns" which were developed to serve the various needs of the mines and miners who worked at them. Lakeshore is on the north end of Crystal Lake at the head of Wisconsin Creek. The property was owned by the Lake Shore Mining company of Ohio and, in addition to the patented mining claims, the company developed a saw mill, a quartz mill, an assay office, bunk and boarding houses, office buildings, store houses, and superintendents quarters.[1112] Leiterville is located roughly two miles down Wisconsin Creek from Lakeshore. Leiterville was developed by 1894 and included a mill, a gravity tramway, housing for miners, and other buildings (Shoemaker 1894:11). Brandon was developed as an ore milling community which was operating at least by 1871 and possibly as early as 1865.[1113] It is located at the lower end of the Mill Creek canyon and included a mill, concentrator, 'saloons, a boarding house, a dance hall, and school house, in addition to the homes -of miners and other residents.[1114] In addition to these three mining communities, Sheridan served as a central supply point for the Sheridan mining district and a shipping point once the railroad came in 1901. Sheridan, located approximately two miles from the southwest border of the mining district, was established in 1866.

Mines are widely dispersed throughout the district. Isolated mines and prospects are located around Copper Mountain, and a cluster of mines is located at the head of Mill Creek. Another grouping is at the lower end of Wisconsin Creek. A small group of mines, including the Sunbeam Mine, is found in an area between the South and North Forks of Indian Creek. Mines are also located in an area on both sides of Noble Fork, including mines near Tom Graham Pass and northeast of Skihi Peak. A large group of

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[1111]Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 15.
[1112]Western Mining World 1901:Vol. 31, p. 33.
[1113]Swallow, 1891. Third Annual Report, Inspector of Mines. State of Montana. Helena, Montana., p. 51.
[1114]Ibid.

prospects and adits are found on the southeast side of Wisconsin Creek in the area of the mining community of Leiterville. And a final group of mines are located at the head of Wisconsin Creek on Independence Gulch, Montana Gulch, in the area of the mining community of Lakeshore on Crystal Lake and the slopes to the northeast and northwest of Crystal Lake, and in the vicinity of Sunrise Lake and Twin Lakes, all in unsurveyed parts of the mountains.

Hard data on the production of lode mines in most of the Tobacco Root Mountains' mining districts are not available. In the case of the Sheridan district there is not even an estimate of production between the years 1863 and 1901. This lack of lode production statistics does not mean that mines were not operating in the district prior to 1900. Quartz veins were discovered in the Sheridan district in 1863 and Winchell indicates that as early as 1864 the Company Mine, on Wisconsin Creek, "was worked in a small way" and the work continued for at least the next three decades.[1115] According to the Reports of the Inspector of Mines of 1889 three mills, the Bradley, Sheridan, and the Leiter and McCranor were active.[1116] Subsequent reports indicated that gold and silver were being produced in the district and mines were being actively worked on Bivens, Ramshorn, Mill, Indian, and Wisconsin Creeks, all of the major drainages in the district.[1117] It can be safely assumed that the reports of the Mine inspector is merely representative of the mining activity and does not attempt to provide a comprehensive list of working mines during any one year. In 1914 Winchell remarked that "The Sheridan district has yielded a regular production of metal annually since about 1865 . . . During a large part of this period [1864-1904] the average annual production was probably several times as great as it has been in recent years.[1118]

In an analysis of the five year period 1909 to 1913, possibly the "recent years" referred to by Winchell, there was a yearly average of nearly sixteen mines in operation. Production during this period included over 4,150 ounces of gold, 22,845 ounces of silver, as well as substantial quantities of lead and copper. The value of all metals produced in the district during that five year period was over $95,500.

Compared to the six other major mining districts of the Tobacco Root Mountains, the Sheridan district faired pretty well in terms of production from 1901 to 1935. Approximately 8% of the gold, 10% of the silver, 25% of the lead, 10% of the copper, and 92% of the zinc produced in the Tobacco Root Mountains came from the Sheridan district. Total value of all metals produced in the district in that thirty-five year period was $829,455. Production appears to have been relatively steady from 1901 to 1935 but there were several periods where value of metals production hit comparatively high peaks, specifically 1904-1905, 1918, 1926, and 1934 -1935. During the 1904-1905 peak yields of gold, silver and lead were about as high as they were going to get during the period. In 1918 production of lead and copper were up and in 1926 silver and lead were nearing or exceeding peak levels. Interestingly, even though the total dollar value of

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[1115]Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", pp. 21,133.
[1116]Swallow, 1890. Second Annual Report, Inspector of Mines, State of Montana. Helena, Montana., p. 67.
[1117]Swallow, 1891. Second Annual Report, Inspector of Mines, State of Montana. Helena, Montana., pp. 51-53.
[1118]Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 139.

metals production was high in 1915, 1934 and 1935, the ,yields, in terms of ounces of gold and silver or pounds of lead, copper and zinc, were relatively low. It might be assumed, therefore, that the metals had increased in price. A trend toward increased mining activity is evident in the mid-1930s with a significantly larger number of mines in operation. This trend probably continued for the rest of the decade.

Mining Districts In the Tobacco Roots

From the beginning of the placer mining period in the 1860s and extending into the lode mining phase before and after the turn of the century, mining activities have been identified in terms of mining districts. A district is, essentially, a clustering of placer or lode mines within a specific geographic area. The districts were created, in part, as a method for establishing local rules within a particular mining area.[1119]

Initially in the Tobacco Root Mountains area, most of the creeks, which were actively mined, were each considered an individual district. Eventually, as larger areas were organized around mills, the identity of the districts changed. Often more than one name has been used for a particular district. And from one published report to another the boundaries of the various districts are seen to shift slightly in one direction or another. It is not uncommon to find the literature on the mines of the Tobacco Roots lumping the production statistics of more than one district together. All of this creates a rather confused picture of the mining districts and, at best only a rough estimate of metals production.

In 1933 geologist Lyman H. Hart noted that 'For the purposes of correlation and discussion the ore deposits of the major portion of the Tobacco Root Mountain area are divided into five regions: Pony, Twin Bridges, Sheridan, Virginia City and Norris".[1120] Other authors have separated out other districts including the Renova district at the northern extreme of the mountains and the Washington district on the interior of the southeastern flank, Potosi Hot Springs district on the interior of the eastern slope, and the Iron Rod district at the northwestern end of the mountain range.

Norris Region

Of primary interest in this report is the Norris region. Norris is a small community which serves as the business center for the various mining districts along the southeastern flank of the mountains and was, during most of the mining period, the terminus of a branch line of the Northern Pacific Railroad. The Norris region, called by many geologists the Norris district, is composed of at least four smaller mining districts, the Norwegian, Washington, Upper Hot Springs, and Lower Hot Springs districts.[1121] Placer mines and lode mines were discovered in the Norris region in the late 1860s.

[1119]Paul, Rodman Wilson, 1963. Mining Frontiers of the Far West. 1848-1880, Holt, Rinehart and Winston, New York., p. 169.
[1120]Hart, L.H., 1933. "Ore Deposits" In, "A Geological Reconnaissance of the Tobacco Root Mountains, Madison County, Montana." Montana Bureau of Mines and Geology Memoir 9., p. 23.
[1121]Winchell, AX, 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 16.

Production from this region was estimated at $3,964,500 between 1864 and 1930, most of which was mined before the turn of the century. As recently as 1988 forty-seven named and unnamed mines were listed in the Norris district, not including mines within the Washington and Norwegian districts.

The Norwegian district is located on Norwegian Creek, north of the town of Norris and south of Pony, a mining community on the northeastern flank of the Tobacco Root Mountains. As such, it does not clearly fall within either the Norris district or the Pony district. The Washington district is generally associated with the North and South Meadow Creek drainage. Upper Hot Springs district refers to the mines above Norris on Hot Springs Creek. And the Lower Hot Springs district includes those mines below Norris on the Hot Springs Creek drainage. In addition, a group of mines, often referred to as the Madisonian group, is located south of Norris and does not fall within the geographic boundaries of any other district. These Madisonian mines are, however, reported within the Norris region.

Lower Hot Springs, Red Bluff District

The Lower Hot Springs (Red Bluff) district is an irregularly shaped mining district located in the eastern one third of T3S, R1W and the western one half of T3S, R1E. The district extends approximately four and one half miles east of the town of Norris to the Madison River and is roughly five miles long, north to south. The topography-is the rolling foothills of the Eastern flank of the Tobacco Root Mountains and on the extreme eastern edge of the district are the steep walls of the Lower Madison River Canyon (Bear Trap Canyon). Hot Springs Creek flows eastward through the northern half of the district and on this creek was located the historic community of Red Bluff which served the neighboring mines. Approximately two and a half miles further east of Red Bluff, Hot Springs Creek empties into the Madison River. The Madison River forms the extreme eastern boarder of the district. To the south the upper reaches of Bradley Creek serves as the border of the Lower Hot Springs district. The road between McAllister, Norris, and Harrison is the western boundary. And to the north the boundary is, for all practical purposes, the divide between Hot Springs Creek and Cold Springs Creek.

Gold was discovered in the Red Bluff area in 1864 and by the late 1860s a small community known as Red Bluff was located on Hot Springs Creek approximately 2.5 miles east of Norris. Some of the mines, including the Red Bluff from which the town got its name, were located, within the community. Because of the water available from Hot Springs Creek some mills were erected in the town of Red Bluff while others were located down stream a short distance and in the hills to the, south. This community served as the headquarters for some of the mining operations and at least one company's assay office was set up in Red Bluff. In addition, the town had a school, post office, two general stores, two hotels, a bank, livery, two saloons, as well as several houses and miner's cabins.

At least two areas were prospected about two miles north of Red Bluff. A good number of the mines are located on the north side of Hot Springs Creek in the vicinity of Red

Bluff. The majority of the mines in the Lower Hot Springs (Red Bluff) district are located to the south of Hot Springs Creek. One large clustering of mines is centered two miles south southwest of Red Bluff. A smaller cluster is roughly one mile further southwest. Another small cluster of mines is located to the southeast of Red Bluff.

Quartz lode discoveries were made in the Lower Hot Springs district beginning in 1864. As early as 1871, a period of roughly seven years since the first discoveries were made, mining had passed through a cycle of boom and bust.[1122] A resurgence during the mid-to-late 1870s kept the Mallory and Olds mill and the Red Bluff arrastre "constantly and fully occupied," and this was a time mills in the Upper Hots Springs district were shut down.[1123] By 1886 it was reported that the "veins of gold-bearing quartz are-generally large and well-defined". Although arrastres and more sophisticated gold milling operations had been established in the Lower Hot Springs district at an early time, some ores were being shipped out for treatment.[1124]

The mine inspector seems to indicate that the district had good potential in the early 1890s since although a large number of quartz claims had been located many were only "partially developed" at that time.[1125] Only sporadic mining was reported for the period from 1900 to 1934 but, as with many mining areas, the mines of this district were revived to some extent during the mid-to-late 1930s Geologist Ernest Thurlow reports that the "district has had several lapses and rejuvenations of mining since discovery. .."[1126]

Mines in this district which are mentioned as "more important" include the Red Bluff, Boaz, Red Chief, Water Lode, Mohican, Grubstake, Montana Boy, Birdie, Josephine, Tippecanoe, Hecla, and Calamont.[1127] In most reports the importance of the Boaz is emphasized over all others. It is, however, difficult to gauge how reliable these reports are since all of the mines in a district are generally not covered in published data on mining activity, particularly for the period prior to 1900.

Between the period 1864 to 1935 it has been estimated that production from the Lower Hot Springs district was approximately $1,000,000, or roughly 25% of the total production from the Norris region. Of this total it is believe that the vast majority, approximately 86% of the total, was produced before 1900. By comparison, it was estimated that between 1935 and 1941 an additional $625,000 was mined in this district.

[1122]Thurlow, Ernest E., 1941. Geology and Ore Deposits of the Lower Hot Springs Mining District, Madison County, Montana. Masters thesis, Montana School of Mines, Butte, Montana., p. 31.

[1123]Raymond, Rossiter W., 1869. The Mines of the West: A Report to the Secretary of the Treasury. J.B. Ford and Company, New York., p. 260.

[1124]Ziegenfuss, C.O., 1886. Western Montana, A Review of the Mineral, Timber and Agricultural Resources of the Counties of Silver Bow, Jefferson, Madison, Beaverhead, Deer Lodge and Missoula with Special Reference to Butte City, The Greatest Mining Camp on Earth, Press of Inter Mountain Publishing Company, Butte, Montana., p. 139.

[1125]Swallow, 1891. Third Annual Report, Inspector of Mines, State of Montana. Helena, Montana., p. 56.

[1126]Thurlow, Ernest E., 1941. Geology and Ore Deposits of the Lower Hot Springs Mining District, Madison County, Montana. Masters thesis, Montana School of Mines, Butte, Montana., p. 31.

[1127]Winchell, AX, 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 116.

Gold and silver are the primary metals mined in this district although copper and lead are also recovered.[1128]

Tidal Wave, Twin Bridges District

The Tidal Wave (Twin Bridges) district covers an oblong region, a maximum of four miles wide (east-west) and more than eleven miles long, along the northwestern flank of the Tobacco Root Mountains. Its eastern boundary is the main ridge of the mountain range and, to the northeast, the South Boulder River. The Wet Georgia Gulch drainage is the southern boundary and the Beall Creek drainage forms the northern boundary. To the west the mountains abruptly end at the alluvial fan located east and north of the town of Twin Bridges forming the western edge of the district. As was the case in the Sheridan district the topography is rugged mountain terrain with steeply cut canyon-like stream valleys. Major creek drainages included in the Tidal Wave district are Beall Creek, Bumby Gulch, Hulbert Creek, Hellroaring Canyon, Dry Boulder Creek, Coal Creek, Bear Gulch, Dry Gulch, Goodrich Gulch, Dry Georgia Gulch, and Wet Georgia Gulch. Nugget Creek is in the vicinity of the southern boundary and mines along this creek have probably been considered in the Tidal Wave district at one time and in Sheridan district at another. The Sheridan district is located immediately south, beginning with Wisconsin Creek. Renova district, starting at Beall Creek, is immediately north of the Tidal Wave district.

Historical records reviewed for this project did not mention any mining communities being located within the Tidal Wave District. It is assumed however, that small communities were located at the heads of some of the gulches. This is particularly true of some of the more remote mining areas such as the head of Bear Gulch and Goodrich Gulch for example. The mines, which are located at the heads of these gulches, are near or above the 8,000 foot level and several miles up the steep, narrow drainages from the Jefferson Valley. It is doubtful that the miners made the long round-trip trek from the valley bottom to the mining sites on a daily basis. The closest major town to the Tidal Wave district is Twin Bridges, a name that has been alternately used for the district in some reports. A settlement was being established in the vicinity of Twin Bridges by 1864 and it served as the main supply and shipping point for the mines of the Tidal Wave district.

The vast majority of the mines are located along the slopes of Wet Georgia Gulch, Dry Gulch, and Goodrich Gulch in the southern end of the district. Also in this area a few prospects and adits are located on the north side of Nugget Creek. Nugget Creek is on the border of the Sheridan and Tidal Wave districts and as a result these mines could be located in either district. Mines are found toward the upper end of Goodrich Gulch. Some of these mines, including the Eleanora Mines, are located on the north slopes of an unnamed peak located in the north half of Section 26, T3S, R5W. A few mines and

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[1128]Thurlow, Ernest E., 1941. Geology and Ore Deposits of the Lower Hot Springs Mining District, Madison County, Montana. Masters thesis, Montana School of Mines, Butte, Montana., p. 32.

prospects are located at the very edge of the western flank of the mountains. Mines are found stretching along Bear Gulch from its lower end, to the very head of the gulch in an area. These mines include the Moffat Mine at the lower end, the Giant Mine roughly half way up the gulch, and the B and H Mine and Pete and Joe Mine at the head of the gulch. To the north of Bear Gulch mines are found on all sides of Smelter Mountain at about the 8,400 foot level. A few prospects are found on both sides of Coal Creek. From Coal Creek to the northern boundary of the district a few mines and prospects are identified including the Ohio Lode Mine and other prospects at the upper end of Hellroaring Canyon, a prospect to the south of Hulbert Creek, and the Strawn Mines in Section 18, T2S, R5W.

Production in the Tidal Wave district prior to 1901, as was the case with the Sheridan district, is uncertain. Winchell remarked that although prospecting was done in the district in 1864 only gold bearing ores drew much attention.[1129] In those early days, "prospectors found rich float and high-grade ore outcropping at the surface. Rich ore was hand mortared and panned, or hauled to an arrastre for treatment".[1130] Opinion on the extent of mining activity during the 1870s and 1880s seems to differ. According to geologist Willis M. Johns mining in the Tidal Wave district declined between 1870 and 1880.[1131] Winchell, on the other hand, stated that by the 1870s the importance of silver and lead in the ores was recognized and the mining activity expanded.[1132] Both geologists identify the importance of the lead component in the Tidal Wave ores and Johns indicates that not only did mining of lead increase during the 1880s but a "small lead furnace was erected for the recovery of lead and gold" produced in the district. Mine Inspector G. C. Swallow reported that in 1890 more than a dozen mines had been opened on Georgia gulch including the Tidal Wave, Empire State, Eureka and others.[1133] It appears that the mining activity continued through the end of the nineteenth century and began to expand significantly after 1900. To accommodate the increasing volume of ore a cyanide plant was built on Little Bear Gulch and a mill was erected on Goodrich Gulch.[1134]

Statistics for the period 1901 to 1935 show a moderately strong and consistent production pattern. Total value of all metals mined in the Tidal Wave district between 1905 and 1911 was 13% higher that the yield from the neighboring Sheridan district during the same period. Metal production in Tidal Wave from 1915 through 1922 was more than twice that of the Sheridan district. And during the increased activity that was evident in both districts in the mid-1930s the Tidal Wave production averaged roughly 38% more than the Sheridan district. The single most important year between 1901 and 1935 was 1916. Nearly 13% of the total production for the thirty-five year period came

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[1129]Winchell, AX, 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas.", p. 145.
[1130]Johns, Willis M., 1961. "Geology and Ore Deposits of the Southern Tidal Wave Mining District, Madison County, Montana." Montana Bureau of Mines and Geology Bulletin 24., p. 4
[1131]Ibid., p. 4.
[1132]Winchell, A.N., 1914. "Mining Districts of the Dillon Qaudrangle, Montana and Adjacent Areas." U.S. Geological Survey Bulletin 574., p.145.
[1133]Swallow, 1891. Third Annual Report, Inspector of Mines, State of Montana. Helena, Montana., p. 53.
[1134]Johns, Willis M., 1961. "Geology and Ore Deposits of the Southern Tidal Wave Mining District, Madison County, Montana." Montana Bureau of Mines and Geology Bulletin 24., p. 4
[1134]Ibid., pp. 4-5.

in that one year alone. In terms of the importance of the various metals, the Tidal Wave district accounted for between 8 and 10% of all gold, silver, copper and zinc mined in the Tobacco Root Mountains between 1901 and 1935. However, more than 50% of all the lead mined during the period came from the Tidal Wave district.

Upper Hot Springs, Sterling, Revenue District

This district includes mines and mills associated with the Sterling and Revenue areas. In some reports a further distinction has been made regarding the location of districts since the Upper Hot Springs district (or Upper Norris Basin district), the Revenue district, and the Sterling district are all three reported to be "within the foothills of the Tobacco Root Mountains".[1135] The Upper Hot Springs district is located west of Norris along the drainage of the upper Hot Springs Creek. The topography-is rolling foothills of the eastern flank of the Tobacco Root Mountains and includes high "flats" where extensive mining developments were located.

The community of Sterling served as the center of the district that took its name. This town was developed at least as early as 1867, when a post office was opened, and continued to be one of the milling and supply points for the Upper Hot Springs district until the 1890s.[1136] Three mills, the Ward, the Pratt, and the Hobert were reported to have once operated in Sterling but all were idle or removed by 1890.[1137]

The Revenue mining area appears to have had a community associated with it since a post office was established in 1886 at Margana and in 1887 the name was changed to Revenue.[1138] It is assumed that the extensive mining, which took place in Richmond flats, would have supported a small community.

Sterling was located at the mouth of Pony Gulch and the Sterling district is a roughly circular grouping of mines located at the mouth and up both sides of Pony Gulch. Pony Gulch is found on the north side of Hot Springs Creek three and a half miles west of Norris. In some early reports this mining area is referred to as the "Sterling belt".[1139]

The prospects in this area, in addition to those at the mouth of Pony Gulch, extend in a north and northwesterly direction for approximately two miles. Maltby's Mound is the northern boundary of the Sterling district. Mines and prospects associated with the Norwegian district are located a short distance further north and west. The Revenue

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[1135]Thurlow, Ernest E., 1941 Geology and Ore Deposits of the Lower Hot Springs Mining District, Madison County, Montana. Masters thesis, Montana School of Mines, Butte, Montana., p. 2.

[1136]Cheney, Roberta Carkeek, 1983. Names on the Faces of Montana: The Story of Montana's Place Names. Mountain Press Publishing Co., Missoula., p. 254.

[1137]Swallow, 1890. Second Annual Report, Inspector of Mines. State of Montana. Helena, Montana., p. 55.

[1138]Cheney, Roberta Carkeek, 1983. Names on the Faces of Montana: The Story of Montana's Place Names. Mountain Press Publishing Co., Missoula., p. 224.

[1139]Ziegenfuss, C.O., 1886. Western Montana, A Review of the Mineral, Timber and Agricultural Resources of the Counties of Silver Bow, Jefferson, Madison, Beaverhead, Deer Lodge and Missoula with Special Reference to Butte City, The Greatest Mining Camp on Earth, Press of Inter Mountain Publishing Company, Butte, Montana., p. 141.

district forms the southern boundary, and non-producing areas to the east and west define the boundaries in those directions.

The Revenue district, which is included in the Upper Hot Springs district, is centered about four and one half miles southwest of Norris. This group of mines is clustered around the Revenue Mine for which the district was named. Most of the mines and prospects are grouped in an oval shaped area approximately two miles long (east to west) and one mile wide. The area is a gently rolling plain which has historically been referred to as Revenue Flats or Richmond Flats.[1140]

In the Upper Hot Springs district the Sterling group of mines are located. The Revenue district mines are located in Sections 29, 30, 31, and 32, T3S, R1 W, and Section 25 and 36, T3S, R2W. Mine shafts, adits, and prospects are located east of the main Revenue group. These mines are almost equal distant between the Revenue and Red Bluff, or Revenue and Madisonian groups and which district they are associated with is uncertain. There are also some prospects located west of the main Revenue grouping. These could as easily be associated with the Washington district as with-the Revenue district.

As early as 1869 it was reported that, the mines of the Hot Spring, or Sterling, district have not, as yet proved remunerative. Five mills were erected, but in all cases, previous to any considerable development of the lodes upon which the hopes of the proprietors were based. One mill, that of the New York and Montana M. & D. Company, has been running with little interruption during the last summer and fall. The ores of the district, i.e., those worked, average probably about the same as in other portions of the Territory from $18 to $20 per ton. The gold, with few exceptions, is of low grade throughout the district, ranging from 550/1000 to 720/1000 fine. This increases materially the difficulty of amalgamation.[1141]

Less than ten years later, in 1877, geologist Rossiter Raymond was reporting that the mines were inactive and the mills stood idle.[1142]

The Revenue area, also called Revenue flats and Richmond Flats, is about six miles west of Norris "near the site of the old Revenue mine".[1143] The Revenue mine is often mentioned in the various geologic reports as the most important mine of the Upper Hot Springs (Revenue) district and was reported to "have produced over $2,000,000 from shallow diggings".[1144] This dollar amount seems unlikely since, by some accounts, all mines in the entire Upper Hot Springs district produced a total of roughly $2.8 million

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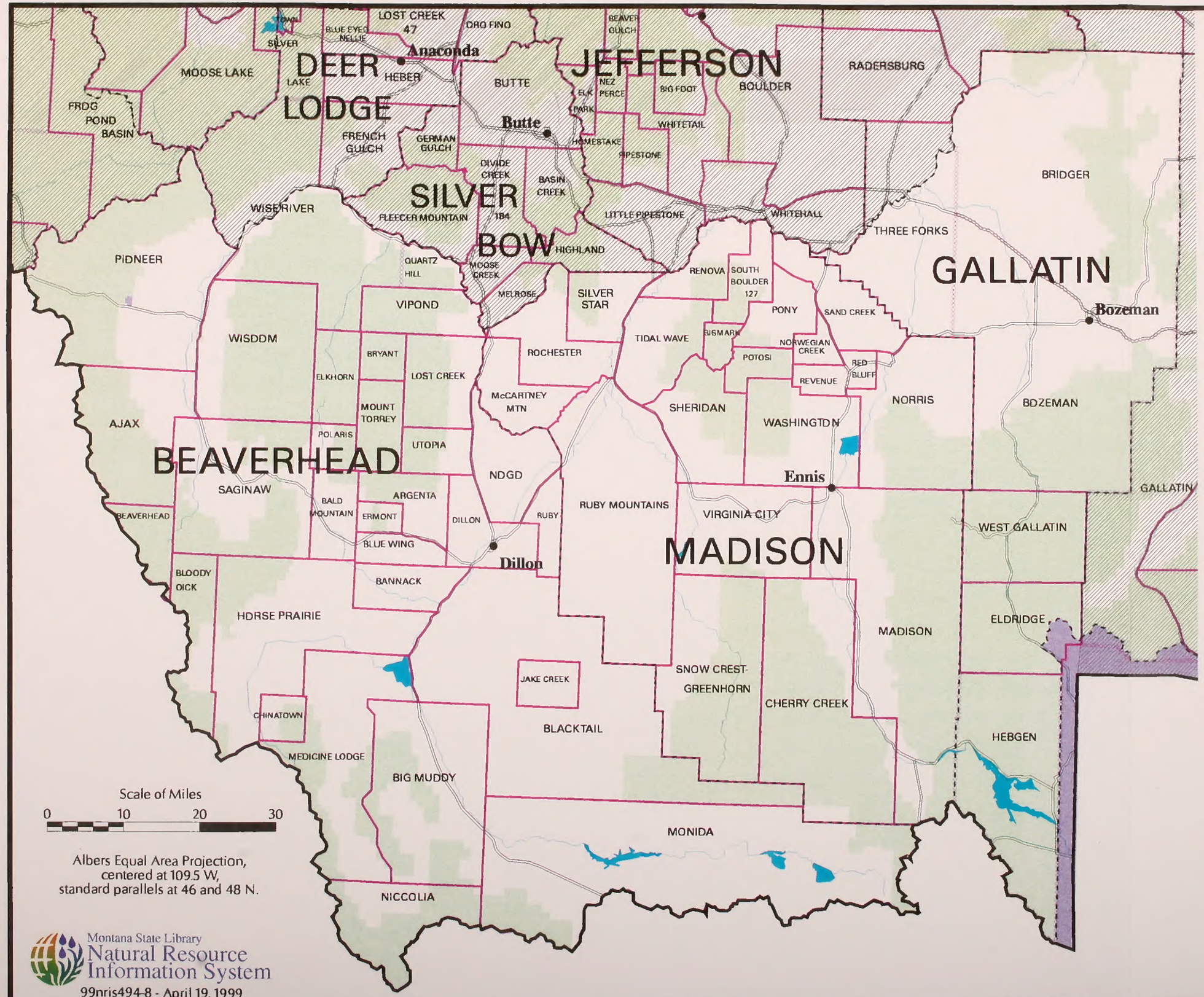
[1140]Byme, John and Frank Hunter, 1899. Tenth Annual Report of the Inspector of Mines of the State of Montana for the Year ending November 30th, 1898. Independent Publishing Company, Helena., p. 17.
[1141]Raymond, Rossiter W., 1869. The Mines of the West: A Report to the Secretary of the Treasury L. J.B. Ford and Company, New York., p. 148.
[1142]Ibid., p. 260.
[1143]Lorain, S.H., 1937. "Gold Lode Mining in the Tobacco Root Mountains, Madison County, Montana." U.S. Montana Bureau of Mines Information Circular 6972., p. 39.
[1144]Sahinen, Uuno Mathias, 1935. "Geology and Ore Deposits of the Rochester and Adjacent Mining Districts, Madison County, Montana." Montana Bureau of Mines Memoir 19., p. 39.



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between 1863 and 1935. In most cases the production statistics for the Upper and Lower Hot Springs districts are combined. Figure 8 shows the number of mines operating and the total dollar value of all metals produced in the two districts between 1901 and 1935.

IV

PROPERTY CATEGORIES AND TYPES

INTRODUCTION

Identification of property types is essential to all aspects of managing historic properties. Often there exists a level of confusion in various historic preservation plans, publications, etc., due to differences between National Register defined property types and those developed and used for management and/or analytical purposes. The intent of this chapter is to direct the reader to the property types as expressed in the National Register # 42 and other National Register publications.

PROPERTY TYPE CATEGORIES

In order to manage historic properties at all scales of significance and geography throughout Montana, a classification system of property types is needed. Because determining eligibility for and listing properties on the National Register is a key element in historic property management it is best to conform to the language of the National Register process. The following hierarchical ordering of properties into Property Type Categories (buildings, sites, structures, objects and districts) and then Property Types (houses, commercial buildings, headframes, tailing piles) comes directly from that language and will better facilitate classification, assessment, mitigation, and interpretation.

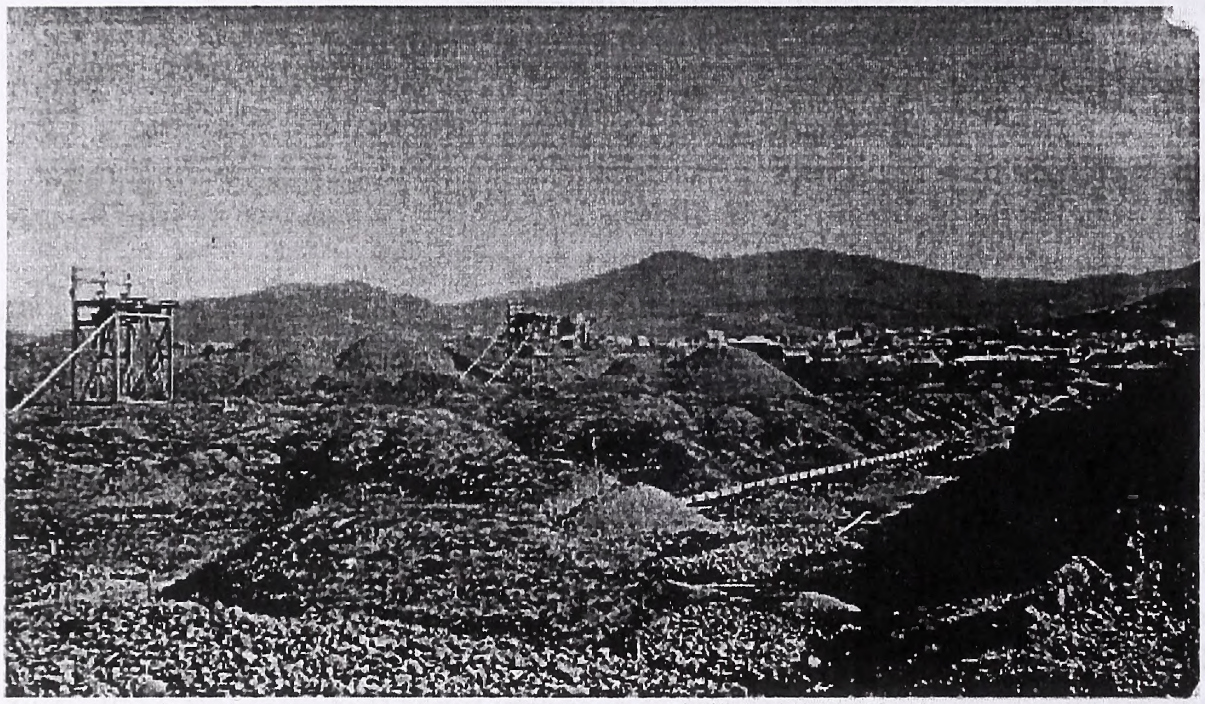
The most important link between the historic contexts developed for mining districts and what exists on the ground is the property type. Individual properties then are documented and evaluated as examples of property types that interpret or illustrate important historical events or patterns persons or architectural/engineering patterns or styles under Criteria A-C or that are repositories of scientific or scholarly information under Criterion D.

In the following definitions and lists of properties and systems of resources, are the key entities which link sites (districts, etc.) to the overall historical patterns and events identified in the historic context in Chapter 3. This ordering of data, from one level of classification to the next, conceptually connects that which exists on the ground to the information in Chapter 3. By understanding a property's type the next step of evaluating integrity and NRHP eligibility may be executed in an informed and systematic manner.

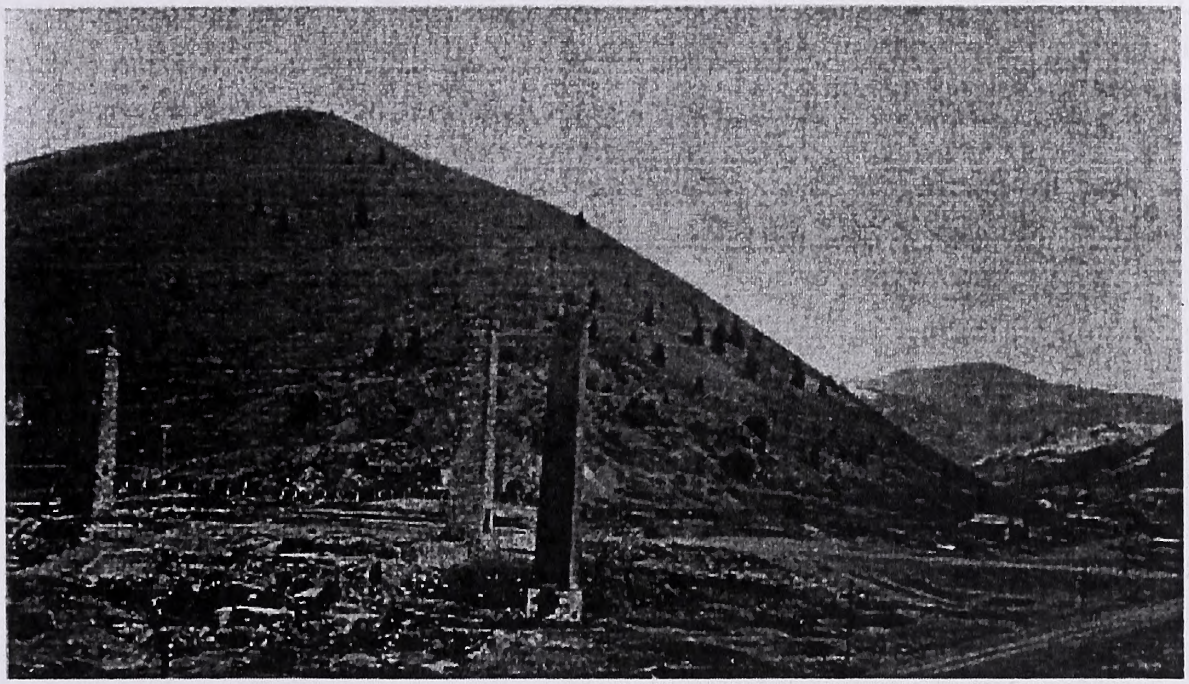
NATIONAL REGISTER DEFINED PROPERTY TYPES

National Register property and resource types are categorized as Sites, Districts, Buildings, Structures, and Objects (NRB 15, 16ABC, 36). These are defined as follows:

SITE: A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure. At the Taylor Thompson diggings in Helena, a site, which possesses no integrity, is now the site of new construction replacing older non-mining structures. If the mine had not been on land which was not developed it would be overgrown in areas with bare gravel piles, and no other remaining structures. On this basis we have a site that if it had survived would not be much more than piles of gravel. National Register Bulletin 42 allows that sufficient integrity may still exist in this case to conclude we have an eligible site, if the other factors were in place.



Taylor Thompson diggings photographed in the 1870s, Helena, Montana. The Great Northern Railroad Depot was later built on this site. (MHS Photo Archives)



Smelter for Alta Mine, Wickes, MT, June 1939. As depicted here, a site with both structures and buildings with sufficient integrity to be eligible for the National Register (since demolished). (MHS Photo Archives)

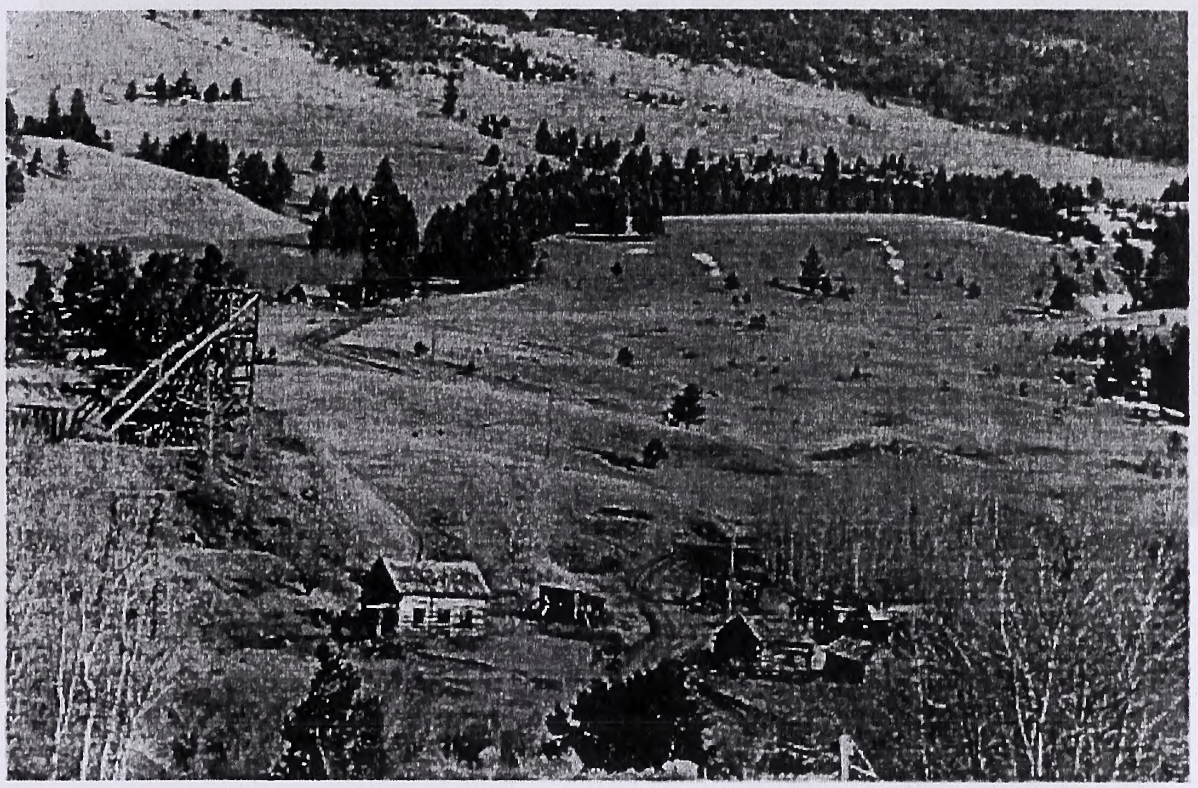
Examples: habitation sites; funerary sites; built up mine site; village sites; mill sites; ruins of historic buildings and structures; mining campsites; trails; impacted landscapes; and others.

DISTRICT: A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

The Elkhorn Mill and mine photographed by Edward M. Reinig after the turn of the century. This district even in a much-deteriorated condition is still eligible. (MHS Photo Archives)

Examples: a central business district; residential areas; commercial areas; industrial complexes; canal systems; collections of habitation and limited activity sites; large milling facilities; transportation networks: and others.

BUILDING: A building such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and a jail or a house and barn.



Rosenfield Mine located near East Helena, April 1971. This site consisting of buildings on the right and a structure on the left clearly indicates the mining process. (MHS Photo Archives)

Examples: houses; boiler house; assay office; dining hall; mills; train depots; hotels, theaters; Schools; stores; and churches.

STRUCTURE: The term "structure": is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter. Examples: bridges; tunnels; gold dredges; fire towers; canals; flumes; turbines; dams; power plants; roadways; kilns; mounds; earthworks; railroad grades; systems of roadways and paths; railroad locomotives and cars; and others.

An un-dated photo of a flume which reflects a structure that could stand-alone but would likely be part of a district. (MHS Photo Archives)

OBJECT: The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.

An arrastra operated by waterpower and probably constructed about 1880. horizontally-and about twenty feet in diameter. It was positioned over a boulder-paved pit six to seven feet in diameter. R.A. Mckay of Missoula MT took this photo in 1910. A structure in this condition still communicates its former use and is eligible despite the fact that all the characteristics are not present. (MHS Photo Archives)

Examples: Mining equipment left on site.

THE INTEGRITY OF HISTORIC MINING SITES

National Register Bulletin #42 specifically addresses questions of physical integrity as applied to historic mining sites. The Bulletin found in the Appendix. Of this document. Generally, the approach identified by the National Register in determining whether a site retains sufficient integrity is if the process of a mining site is visible in its remains. On simple way to field test this approach is to find an overlooking position affording the maximum view of the site. Imagine that you have in front of you an interpretive map of the site which points out foundations and ruins visible from your vantage point. Can you see the mining process being explained to you on the imaginary map using

those site features? If so, there is a chance the site has sufficient integrity to be eligible. An alternative to the overlook is to consider the imaginary map as a series of stops along a trail through the site. Can you see what was happening at this place? In other words, is there enough of the site left for public interpretation and understanding?

DISTINGUISHING BETWEEN SITES, MINING DISTRICTS, HISTORIC DISTRICTS AND LANDSCAPES

As stated in NRB 36, in general, historical and historical archaeological properties will be classified either as sites or as districts. Buildings, structures, and objects are mostly used as terms for describing components or features of sites and districts. For NRHP purposes and as written above, a site is the location of a significant event or of historical human activity. The location must possess historical, cultural, or archaeological value regardless of the value of any existing building or structure. A district, on the other hand, is a grouping of sites, etc. that are linked historically by function, theme, or physical development. Individual sites so linked are referred to as CONTRIBUTING RESOURCES in the district. Property types not linked to such values are NONCONTRIBUTING RESOURCES in the district.

The NRHP deals with contributing and noncontributing resources through the following guidelines (NRB 36):

A contributing site, district, building, structure, or object adds to the historical associations, historic architectural qualities, or archaeological values for which a property is significant. A noncontributing site, district, building, structure, or object does not. A contributing resource has the following characteristics:

1. It was present during the period of time that the property achieved its significance

2. It relates to the documented significance of the property.

3. It possesses historical integrity or is capable of yielding important information relevant to the significance of the property.

When counting contributing resources the NRHP guidelines are as follows:

1. Count a geographically continuous site as a single unit regardless of its size or complexity.

2. Count separate areas of a discontiguous district as separate entities (e.g., sites, structures, etc.,).

3. Do not count minor resources (such as small sheds, grave markers, or machinery) unless they are important to the property's significance.

4. Do not count ruins separately from the site of which they are a part.

5. Do not count landscape features (such as fences and paths) separately from the site of which they are a part unless they are particularly important or intrusive.

Discontinuous Districts

The relationship between sites and districts is crucial when one is identifying the type of registration tool to use. For example, when sites within a proposed district are not contiguous, that is, when the space between sites is not significant even though the sites have a direct relationship through cultural affiliation related elements of a pattern of land use, or historical development. The property is best classified as a **discontiguous district** (NRB 36, 42 16A). A discontiguous district is most appropriately defined when:

Elements, such as sites, are spatially discrete

Space between the elements, or sites, has not been demonstrated to be significant as it relates to the district.

Visual continuity is not a factor in the significance.

Multiple Property Formats

If a combined set of small districts, sites and structures relates significantly to a recognizable theme or context these unified properties may be defined as eligible using the Multiple Property Format (see NPS Bulletin 16B).

PROPERTY TYPES

Property types are individual sites or objects defined by function or another description related to their historical significance. Simply put, property types are what one calls a site, whether it's a chicken coop, outhouse or roller mill. Historic mining properties are found in many different states of deterioration or repair and vary in their geographic extent. We may find all kinds of structures that relate to mining, such as flumes, headframes, mine tailings, adits, prospects, shafts, waste rock dumps, and Smelter remnants, which all had various functions. Some of these were used for extraction, others for benefication, or refining. One may also find a variety of buildings such as houses or cabins, hoist houses, assay offices, and other support facilities. A site is the location of a significant event of historic occupation or activity (for our purposes here a site is a group of buildings or structures related to mining activity). If the site,

structures or buildings are gone you may still have a eligible site if you can discern how the mining process was carried on at that location.

Where we find an historic connection of two or more mining sites we would have a district. As the NRB 16A puts it: "A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development." In the case of working with historic mining sites, however, there are confusing aspects relating to the way the term "mining district" is defined and used.

MINING DISTRICTS vs. HISTORIC MINING DISTRICTS

Over the years, areas with a series of active mining projects have been identified as "mining districts" for legal and administrative purposes. These administrative entities are often confused with "historic districts" as referred to by cultural resource managers. Miners created mining districts, first in California, as "ad-hoc" political units where no local government had existed before mining development occurred in an area. These districts were vaguely defined and represented a temporary division and organization created by the inhabitants of a mining region. For the purpose of this plan, the term Mining District should be considered to refer to vague, historic, ad-hoc administrative areas. The term, **Historic Mining District** will refer to concentrations of related historic property types.

Mining Claims.

Mining "claims" are a much more definitive unit utilized to study historic mining. Claims have to be surveyed and delineated on the ground to ensure ownership of mineral rights, while districts were often no more than a means of locating one's claims in a general geographical area and usually did not have surveyed and/or marked boundaries.

Historic District as Defined for This Plan

For the purposes of this Plan, Historic Districts of several types will be made up of one or more Site. Historic Districts that are made up of mostly historic mining Sites and will be classified as "Historic Mining Districts."

NRB 42 states that:

> Individual mining properties do not exist in isolation. Based on the premise that individual mining resources will usually serve as single elements of larger mining systems, only a relatively small percentage of resources will be nominated as individual buildings or structures.

> Given the prevalence of mining systems, the historic district is a common framework for nominating a concentrated assemblage of related mining resources to the National Register... Most potentially eligible mining properties do not consist only of a single resource, but rather will include a discrete historical area containing a grouping of functionally related resources that all have played a part in the extraction, refinement, and production of minerals.

An example of a Historic District is an area located within the Deerlodge National Forest (with inholdings of private land) containing the historically labeled mining districts of Georgetown-Southern Cross, Cable, Red Lion, Silver Lake, and Blue Eyed Nellie as described in Uuno Sahinen's Mining Districts of Montana (1935). These five, distinct yet historically connected districts are adjacent to each another and straddle the boundary between Granite and Deer Lodge Counties. As is the case with most mining districts, there are no easily defined boundaries between them on the ground. However, if we use historical, archival, documentary information in conjunction with our field data, patterns of distinct use and interrelationship begin to emerge and a Historic District may be defined.

Historic Mining Landscapes.

After the analytical step of defining a Historic District is made, that district entity may be labeled a **Rural Historic Landscape**. National Register Bulletin 30 defines a Rural Historic Landscape as: "a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or invention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. "National Register Bulletins 30 and 42 state that "Landscapes can be described and evaluated by utilizing the methodology applied to rural historic landscapes. In most cases, mining [and other historic] landscapes will be defined as historic districts for the purposes of National Register nominations." In the context of this Plan, Historic Landscapes will consist of one or more Historic Districts

The evidence of human use or activity is examined through eleven landscape characteristics:

land uses and activities;
patterns of spatial organization;
response to the natural environment;
cultural traditions;
circulation networks;
boundary demarcations;
vegetation related to land use;
buildings, structures, and objects;
clusters; archaeological sites;
and small-scale elements (NRB 30: 2-3).

Note that the term "landscape" is used here as it is defined in National Register Bulletin 30. It is important to remember that historic landscapes are listed in the National Register as sites or historic districts.

For purposes of this plan it is important to remember that districts will likely have large areas within them that are void of any sites, buildings, or structures. Where this is the case we manage only those areas were the sites, buildings or structures will be effected.

ORGANIZATION OF PROPERTY TYPES BY RESEARCH DOMAIN

The term "Research Domain" is just another way of saying 'historic theme" and placing an emphasis on the expected research outcomes which site information contributes to those themes. The relationship between Property Types and the Research Domains is quite important. The various property types, buildings, and structures exist as physical entities on the land. The utilization of the research domains helps to connect these general property types intellectually with all their various forms to viable research questions, and subsequently relate site information to the strategy of managing sites themselves.

PROPERTY TYPES BY RESEARCH DOMAIN

The list of Property Types, provided on the following page, is organized by research domain. The designations used here will enable users of this plan to follow a logical sequence of analysis for historic properties. Individual Sites types and Site-Systems fit within a larger historical and theoretical context from which to evaluate eligibility and determine, if necessary, mitigation procedures.

Domain I: Mining Development Site-Systems with Associated Site Types	Domain II: Mining Community Development	Domain III: Historic Landscapes/Regions
Mining Site-Systems *Industrial Mines Deep Underground Mines Large Scale Placer Hydraulic Mines *Subsistence Mines Rathole Mines Small Scale Placer Metallurgy Site-Systems Sluices Dredges Arrastras Stamp and Pan Mills Cyanide Mills Support Site-Systems *Logging Sites *Water Eng. Systems Reservoirs Dams Ditches Headgates and Checkdams *Transportation Systems Railroads Roads and Pathways *Services Blacksmith Shops Civic Meeting Places Stores Recreation	Domestic Household Types *Building Pad/Dugouts *Trash Concentrations *Privy Pits & Outhouses *Log Structures/Houses Boarding Houses Single Family Dwellings *Frame Structures Boarding Houses Single Family Dwellings Satellite Residential Settlements *Clusters of Households *Towns *Mining Camps *Homesteads Domestic Structures Agricultural Buildings Trash Concentrations *Recreation Cabins	Early Mining Districts *Prospect Pits *Rathole Mines *Connecting Roads Trail Industrial Mining Districts *Large Mines Complexes *Transportation Systems *Community Systems *Large Scale Water Systems Homestead/Agricultural Districts *Domestic/Homestead Systems *Transportation Systems *Water Systems Historic Logging Districts *Logging Transport Systems *Domestic /Logging Camps Water Developments Dist *Water Engineering Systems *Lakes and Reservoirs Community Districts *Domestic Households Syst *Satellite Residential Systems *Mining Camp Systems Recreation Districts *Recreation Cabins/Resorts *Transportation Systems *Water Engineering Systems *Domestic Household Syst

RESEARCH DOMAIN # 1: PROPERTY TYPES RELATED TO MINING TECHNOLOGY

Several property types expected to be among the most significant in the Study Area convey images of and have the potential to answer research questions about variability and change in mining technology and how those changes impacted the activity and structure of the workplace. For the purpose of property type identification under this Problem Domain, mining technology is divided into Industrial Mining and Subsistence Mining.

Industrial Mining: The property types related to industrial mining likely to be extant in Montana cover a wide variety including, but not limited to: mine shafts, shaft houses, hoisting works and engines, sorting and sampling rooms, changing rooms, boilers,

boiler houses, adits, prospects, air shafts, offices, powder magazines, stamp mills, smelters, waste rock, tailings, tailing ponds, mine haul roads, rail road beds, large size placers (dredge), assay offices, industrial debris middens. There also are types that act to bridge the gap between community and industrial mining such as company boarding houses, individual houses, and other worker facilities.

Subsistence Mining: The property types most significant to subsistence mining will include all or most of the above, as facilities abandoned after the great boom eras were often reused or salvaged by subsistence miners. Small scale placers, arrastras, water diversion and storage systems, pits for mining and prospecting, and similar types of properties also indicate subsistence mining. These property types may very well be later adaptations of leftover materials from earlier periods, offering glimpses into the evolution of a mining complex through time.

ELIGIBILITY GRID FOR DOMAIN # 1

Level of Significance	Criterion A	Criterion B	Criterion C	Criterion D
National	Relates to broad patterns of mining technology significant to United States history. Example: Colorado Tailings (24SB192) CD	Relates to an important individual in American history associated with Mining site-systems. Example: Colorado Tailings (24SB192) CD	New technology of its period or representative example of mining structures or buildings. Example: Canyon Creek Charcoal Kilns (24BE804) CD	Has potential to yield information, important to understanding mining at the national level. Example: Colorado Tailings (24SB192) CD
State	Relates to broad patterns of mining technology significant to Montana history. Example: Dickman Mill (24JF1216) CD	Relates to an important individual in Montana history associated with Mining site-systems. Example: Gregory Mine (24JF480) DOE	Relates to new technology of its period or a unique design of mining structures or buildings important to Montana history. Example: Frohner Mine & Mill (24JF1560) CD	Has potential to yield information, important to understanding mining activities important at the Montana state level. Example: Canyon Creek Charcoal Kilns (24BE804) CD
Local	Relates to broad patterns of mining technology significant to local history within Montana. Example: Indian Creek Placer Mine (24BW752) CD	Relates to an important individual of local significance associated with Mining site-systems. Example: Canyon Creek Charcoal Kilns (24BE804) CD	Relates to new technology of its period or a unique design of mining structures or buildings important on at the local level. Example: Powder Magazine (24MA1123) CD	Has potential to yield information, important to understanding mining activities at the local history level. Example: Lincoln Arrastra (24LC1274) CD

RESEARCH DOMAIN # 2: PROPERTY TYPES RELATED TO COMMUNITY

Property types included within the community theme are those that convey something about the processes and components of the various communities located in and around the various districts. Property types are grouped within property categories based on function or use.

One such significant property category is the domestic household. The domestic household is both a means of conveying images and answering research questions about variability and changes among households in the community, demography, social geography, consumer behavior, ethnicity, class and occupation, and gender/gender roles. Significant property types of the domestic household category may include at least five distinct kinds of household organizations, including single person, cooperative, occupational, family, and boarding houses. Each of these types may have several variants related to factors such as geography, demography, ethnicity, class, and economics.

Property types related to commerce also are significant as a way of conveying images of and answering research questions about economic networks, occupations, and settlement patterns. Included are the material correlates of significant businesses in communities such as saloons, brothels, hurdy-gurdies, blacksmith shops, liveries, and the like. In addition, property types related to institutions affiliated with the mining trade may be located. Remains may include miners' union halls, fraternal organization halls, health care facilities, etc. Finally, property types related to transportation are significant, including pathways, roads, way stations, railroads, depots, and so on. Surviving transportation routes are important means of conveying images of and answering questions about circulation of goods and supplies, social interaction networks, and relationships among settlements; all of these directly relate to the concept of historic landscape.

Other property types in Montana related to community processes and components are defined at a larger geographical scale. Distinct type and domestic households into some kind of geographical, social, or economic networks, for example define settlement types. Residential, industrial, or commercial neighborhoods defined by activity, occupation, class, ethnicity, or gender is one example of a settlement type that is expected in Montana. Other settlement types related the research questions include towns, camps, and isolated house sites, along with interconnecting roads and railroads. Factors such as ethnicity, technology, occupation, demography, geography, and economics are expected to create variants of each of these settlement types. Hierarchical arrangements among settlements sometimes are the key to identifying distinctive property types.

ELIGIBILITY GRID FOR DOMAIN # 2

Level of Significance	Criterion A	Criterion B	Criterion C	Criterion D
National	Relates to broad patterns of mining community development significant in United States history. Example: Marysville Historic District (24LC1083) DOE	Relates to an important individual in American history associated with Mining community development. Example: Butte Historic District (24SB354) NR	Relates to a unique design of mining community building or structures significant at the national level. Example: Butte Historic District (24SB354) NR	Has potential to yield information, important to understanding mining communities at the national level. Example: Butte Historic District (24SB354) NR
State	Relates to broad patterns of mining community development significant to Montana history. Example: Granite Miners Union Hall (24GN365) CD	Relates to an important individual in Montana history associated with Mining community development. Example: Marysville Historic District (24LC1083) DOE	Relates to a unique design of mining community structures or buildings important to Montana history. Example: Granite County Jail (24GN500) NR	Has potential to yield information, important to understanding mining communities important at the Montana state level. Example: Union City (24MA1773) NR
Local	Relates to broad patterns of mining community development significant to local history within Montana. Example: Pioneer Cabins (24MA1872) CD	Relates to an important individual of local significance associated with Mining community development. Example: NEEDS WORK	Relates to a unique design of mining community structures or buildings important on at the local level. Example: "150" House (24JF193) DOE	Has potential to yield information, important to understanding mining communities at the local history level. Example: Pioneer Cabins (24MA1872) CD

RESEARCH DOMAIN # 3: PROPERTY TYPES RELATED TO LANDSCAPES

Several property types are expected to convey images of, and answer questions about variability and change in historic landscape. Property types should be associated both with landscape components and processes. Property types that convey mining as a dominant land use practice are expected to be significant. Clusters which represent major settlement patterns associate with distinctive mining technologies, such as industrialized underground mining or those associated with other historic themes, such as timber harvest as a support activity, may be included within a possible landscape component conveying mining and support networks. The clusters arranged around Highland City, Elkhorn, and Granite are possible examples. A broad geographical zone associated with a particular type of mining that endures over a period of time is another group of expected property types. The placer gravel in German Gulch and Gold Creek will be included within such geographical zones. Massive landscape alterations, such as large and/or numerous waste rock dumps or mill tailings are evident in Montana. Major circulation networks associated with the transport of ore from mines to mills and with the movement of people and supplies to and from mining districts are significant components of a mining landscape.

For the purposes of this Plan, Historic Districts and Landscapes are identified as consisting of a variety of Site-Systems. The identification and use of the system concept allow us to link sites to broad behavioral patterns on the landscape. It must be made clear that where a landscape may have lost the vast majority of its integrity, one could likely still have structures or buildings that would constitute an eligible site. We should always look for a landscape, but should not consider every system a landscape. The system concept can only take us so far.

ELIGIBILITY GRID FOR DOMAIN # 3

Level of Significance	Criterion A	Criterion B	Criterion C	Criterion D
National	Relates to broad patterns of mining districts and landscapes significant in United States history. Example: Bannack Historic District (24BE169) NR	Relates to an important individual in American history associated with mining districts or landscapes. Example: Marysville Historic District (24LC1083) DOE	Relates to a unique design of mining building or structures within districts or landscapes significant at the national level. Example: Virginia City Historic District (24MA723) NR	Has potential to yield information, important to understanding mining districts or landscapes at the national level. Example: Bannack Historic District (24BE169) NR
State	Relates to broad patterns of mining districts and landscapes significant to Montana history. Example: Lincoln Historic Mining District (24LC1191) CD	Relates to an important individual in Montana history associated with Mining districts or landscapes. Example: NEEDS WORK	Relates to a unique design of mining structures or buildings within districts or landscapes important to Montana history. Example: Basin City Historic. Example: Ruddville Historic District (24JF59) CD	Has potential to yield information, important to understanding mining districts or landscapes important at the Montana state level. Example: Lincoln Historic Mining District (24LC1191) CD
Local	Relates to broad patterns of mining districts and landscapes significant to local history within Montana. Example: White's Gulch District (24BW801) CD	Relates to an important individual of local significance associated with Mining districts or landscapes. Example: NEEDS WORK	Relates to a unique design of mining structures or buildings within districts or landscapes important at the local level. Example: White's Gulch District (24BW801) CD	Has potential to yield information, important to understanding mining districts or landscapes at the local history level. Example: Libby Historic Mining District (24LN1323) CD

I'm not sure I have any feeling for these domains – I simply don't have enough info. on the properties used as examples.

V

MANAGEMENT RECOMMENDATIONS

TREATMENTS BY RESEARCH DOMAIN AND LEVELS OF SIGNIFICANCE

The primary objective for this plan is to protect information on and select sites for public interpretation of historic mining in Montana so that a network of mining sites of national, state and local significance remains protected for the use and enjoyment of citizens and visitors. Research domains used in this plan will be referred to when considering whether a representative cross section of historic properties in the mining context is being protected on the national, state and local (mining district) levels of significance.

I thought objective was to develop consistent way to evaluate alternatives under Sec. 106.

A wide range of projects has the potential to affect historic mining properties and districts. Some merit more consideration in the Section 106 compliance reviews process then others. The effect of many of these projects, such as replacing a stock watering tank near an old adit or improving a road through a mining site to access adjacent private land may be very minor actions. This is true especially when compared to the overall size, integrity and/or significance of the effected site. Neither the agency nor SHPO will expect detailed project alternative development and consultation for such minor projects. In contrast, major mine reclamation or watershed restoration activities involving the removal of key site features (buildings, or structures) will require continued development of historic context and full exploration of project alternatives. This Plan provides for consideration of mitigation and treatments commensurate with the scope of the project and the significance of the affected property.

→ Should introduce the PA first.

Standard Section 106 procedures require consultation with both the SHPO and ACHP for projects adversely affecting significant mining properties, so these procedures will be briefly dealt with. These consultations (particularly with the ACHP who may not have intimate knowledge of a project) may delay implementation of critical actions such mine reclamation completed under the provisions of CERCLA. Under this Plan, the ACHP will participate in Three-Party MOA's for non-routine and/or inter-agency projects that either require an EIS, affect a National Historic Landmark or National Register property of national significance, are highly controversial, or are otherwise outside the scope of the PA. The focus of most interagency consultation will be kept at the State level. The bulk of regular agency projects, which adversely affect less significant mining properties, will be considered under a two-party MOA between the agency and SHPO. On these types of mining related projects the SHPO has 20 days to review and comment on agency effects determinations and treatment/mitigation.

Agencies have legal responsibility for the protection and management of historic mining sites on public land under the Section 110 laws. The SHPO is responsible for guiding and assisting federal agencies in the long-term preservation planning for these

sites. The PA does not relieve any agency of the Section 110 responsibility, but does establishes an alternative approach to meeting legal compliance with NHPA and NEPA. While it is not substantially different than standard Section 106 procedures, it does addresses both technical and programmatic issues and expectations that have hampered constructive interagency project consultation in the past.

LEVELS of EFFORT:

Levels of effort (the expenditure of time and money) which agencies direct toward the protection of any historic mining site or feature will depend on these items:

HISTORICAL SIGNIFICANCE OF THE HISTORIC MINING PROPERTY

Sites of high levels of significance, whether of state, local or national importance, will be given priority in levels of preservation effort. This means that the energy devoted to each of the items in the Steps to Treatment below shall be on a par with the most important environmental considerations an agency deals with in the course of mitigating impacts to projects.

PUBLIC INTERPRETIVE POTENTIAL OF THE HISTORIC PROPERTY

Whether the site offers the public a means of experiencing and understanding a historic property will influence the level of effort devoted to its survival. Factors to be considered there include:

* Means of public access (the proximity of a highway, trail or recreation area);
* Availability of other funds for interpretation (the applicability complementary programs such as scenic by-ways, recreation projects, or public participation projects such as Passport in Time);
* The physical integrity of a surviving feature (a surviving mining building or structure which is relatively sound);
* Coordination with the Friends of Montana Mining History (Agencies will invite public participation in the protection of historic mining properties through the creation of a non-profit organization. See below)
* Other factors identified in the Steps.

SITUATIONAL OPPORTUNITIES FOR THE PROPERTY TO SURVIVE. It is not for this generation to presume which historic mining sites will survive into the future. Rather, this plan recognizes that opportunity for site protection is an unpredictable, cyclical circumstance, which can be taken advantage of in unanticipated ways. (See the items in the Steps to Treatment below).

LOCAL SIGNIFICANCE LEVEL OF EFFORT

For sites of local significance to the context, agency CRM personnel will:

1. Notify project area supervisors and any affected parties of the significance of the property and the steps to be taken.
2. Contact local historical societies and invite their participation in protecting information, artifacts, features and structures impacted by a project.
3. Solicit responses from known sources (including affected parties and local mining history support groups) on the availability of assistance, cooperation or other types of consideration of the measures identified in the Steps to Treatment above.
4. Prepare recordation of the historic property
5. Follow up on responses to the options in the Steps to Treatment
6. Prepare the Mitigation Plan
7. Submit the preservation plan to the agency cultural resource manager.

STATE SIGNIFICANCE LEVEL OF EFFORT

CRM personnel will:

8. Notify project area supervisors, the agency cultural resource manager and any affected parties of the significance of the property and the steps to be taken. The agency cultural resource manager will notify the SHPO.
9. Contact local historical societies and invite their participation in protecting information, artifacts, features and structures impacted by a project.
10. Solicit responses from known sources (including affected parties, the agency cultural resource manager and local mining history support groups) on the availability of assistance, cooperation or other types of consideration of the measures identified in the Steps to Treatment above.
11. Prepare recordation of the historic property
12. Follow up on responses to the options in the Steps to Treatment
13. Prepare the Mitigation Plan
14. Submit the preservation plan to the agency cultural resource manager.

NATIONAL SIGNIFICANCE LEVEL OF EFFORT

CRM personnel will:

15. Notify project area supervisors, the agency cultural resource manager and any affected parties of the significance of the property and the steps to be taken. The agency cultural resource manager will notify the SHPO and the Advisory Council.
16. Contact local historical societies and invite their participation in protecting information, artifacts, features and structures impacted by a project.

17. Solicit responses from known sources (including affected parties, the agency cultural resource manager and local mining history support groups) on the availability of assistance, cooperation or other types of consideration of the measures identified in the Steps to Treatment above.
18. Prepare recordation of the historic property
19. Follow up on responses to the options in the Steps to Treatment
20. Prepare the Mitigation Plan
21. Submit the preservation plan to the agency cultural resource manager.

Compliance Guidelines

All historic mining properties will be recorded and their historic information prepared for future research and public interpretation. All mining properties will be given preservation consideration, however, sites of less significance or sites otherwise less desirable will not be granted high priority for physical protection. All mining structures, buildings, objects and sites which can be avoided in the course of federally funded projects will be so avoided.

Select sites, which offer the public access, visibility, exceptional or essential information, whether as museum pieces or adapted structures, will be given priority for physical preservation. To further protect historic mining sites from disintegration, agencies will initiate stabilization programs for avoided properties. Historic mining structures or buildings possessed of excessive toxin levels are recognized hazards and subject to removal.

Historic mining buildings or structures whose deterioration may create hazardous conditions are not to be automatically excluded from preservation consideration. Rather, stabilization methods are to be considered for such features and will be used if feasible. Otherwise, unsafe structures are to be removed or dismantled to condition precluding their collapse.

Project inventory In the Area of Potential Effect (APE)

The PA closely follows the FS Region I PA, the BLM National PA and/or standard Section 106 procedures. The project APE is defined according to 36 CFR 800.2(c) Heritage inventories will be completed in advance of all ground-disturbing projects except those identified below. Categorical Excluded are non-ground disturbing and/or site invasive (visual, audible, atmospheric) activities or projects that have no effect on historic hard rock or placer mine sites, structures or buildings based on project design. Only these projects are categorically excluded from further Section 106 consultation for purposes of this Plan. Categorical exclusions include the following classes of activities but they are not limited to those identified here. These are only excluded if they only effect hard rock or placer mining properties:

1. New fence line construction
2. Placement of range improvements in existing channels and disturbed areas
3. Non-mechanical forest product removal (plants, seeds, mushrooms, firewood, bark)
4. Plant cultivation on previously tilled ground or with non-mechanized equipment
5. Road and trail maintenance and re-surfacing
6. Installation and maintenance of utility pipe and transmission lines in disturbed road prism
7. Non-mechanical commercial and recreational mineral prospecting
8. Mineral exploration and drilling in previously disturbed areas
9. Assessment and analysis of abandoned mine sites for reclamation (sampling waste rock piles)
10. Issuance of permits for grazing, outfitting, etc

Compliance inventories yielding no historic mining properties may be reported to SHPO on a case by case bases or in the annual report. The project may then proceed without further Section 106 consultation. For example, a negative inventory of a two-acre APE encompassing a range (stock tank/spring box) improvement could either be reported immediately to the SHPO or in a year-end comprehensive compliance report prepared by the Agency. The activity could proceed immediately upon appropriate notification to the agency decision-maker of "project clearance" by the heritage specialist.

Review and Monitoring

An annual review is required of all mine-related activities. This review will be conducted by May 1 after the project data has been compiled in agency compliance reports completed under the terms of the R- I Forest Service/BLM National PA's. These data are critical to monitoring and improving our treatment of mining properties, and will contribute to the further development of Chapters three and five.

The Process of Treating Historic Mining Sites:

INVENTORY: Inventory will be conducted in a manner consistent with the provisions of the context. Statements of significance, integrity and property types will be so related.

RECORDATION: All historic mining sites encountered in the course of a federal undertaking shall be recorded. To the greatest extent possible, scopes of work and agency conducted recordation projects will result in products sufficient to qualify for Mitigation Through Recordation standards.

EVALUATION: evaluation to significance of historic mining sites is carried out using the information in this plan. Language in evaluative documents will refer to the plan's

historic context, property type and research domain classifications discussed in Chapter four.

NOMINATION: (and Determinations of Significance): the historic context provided in the plan can serve as the statement of significance for individual mining sites. In preparing formal determinations, whether as a nomination or a consensus determination, CRM personnel should be familiar with the provisions of National Register Bulletin #16B.

TREATMENT: ALL historic mining sites potentially affected by federal undertakings will be subjected to the following standard treatment steps:

AVOIDANCE OR MITIGATION OF ACTION IMPACTS

If properties eligible for the register are found to exist within the action's area of effect, the agency shall determine, in writing, whether the action will have an adverse effect on that property and propose mitigation of the effect. If the agency determines that an action will have an adverse effect, it shall prepare a written explanation of why one or more of the actions in (a) through (d) has been chosen and how it will be carried out. In determining mitigation the agency shall solicit the opinions of interested parties and may otherwise collect public comment on the protection of heritage property or paleontological remains in the area of effect as to:

(a) Protecting the heritage values of the heritage property by avoiding such property;
(b) Abandonment of the proposed action;
(c) Modification or redesign of the proposed action to avoid or lessen adverse effects or mitigate harm or alteration through any method including:
    (i) Relocating the action;
    (ii) Incorporating the heritage property into the action in a useful way;
    (iii) Inviting private, commercial, non-profit, governmental or other interests to use the historic property in productive ways;
    (iv) Scientific excavation of archaeological deposits;
    (v) Recordation of heritage properties prior to their removal or alteration;
    (vi) Production of a public education program about the property; or
(d) Continuance of the project with no avoidance or mitigation measures.

If, upon completion of its assessment of action impact, the agency finds the action to have adverse effects, the agency shall forward a mitigation plan to the SHPO for review and comment. Mitigation plans shall address whether or not the properties might be utilized for practical purposes in that they:

(i) Possess the potential for promotional, commercial, recreational or other uses, which may provide economic gain to citizens of the state or use by units of government;

(ii) Embody educational information, which may be applied to instruct children or adults in aspects of Montana's history;

(iii) Have social associations which illustrate the interaction and behavior of people in Montana's history;

(iv) Possess attributes that support the appreciation of heritage values through sightseeing, photography, painting or other means of personal experience or artistic expression;

(v) Have cultural associations which illustrate and contribute to the understanding of human cultures; or

(vi) Otherwise contribute to the public interpretation section of this plan.

STEPS TO MITIGATION

For all projects that may adversely affect historic mining features, buildings, structures and mining complexes, as well as historic archaeological sites, the agency will sequentially consider the following treatment steps for both Two-Party and Three-Party MOA(s):

1. Protecting the property by abandoning the project
2. Avoiding the historic property during implementation of the undertaking
3. Modification or redesign of the proposed project to eliminate or lessen adverse effects, including:
   A. Relocating the project
   B. Incorporating the historic property into the undertaking in a useful way
   C. Inviting private, non-profit, governmental or other interests to use the property in productive ways
   D. Providing public interpretation and education programs,
4. Recording the historic mining property or feature to HABS/HAER Levels I or II standards using a large format or 35 mm photography, as agreed to in an Two-Party or Three-Party MOA prepared for the undertaking, as well as additional historic context development if none has been produced

The amount of agency effort expended toward pursuing these various management options will vary.

ABANDONMENT AND AVOIDANCE

Abandonment may not be a viable project alternative in many cases but Agencies routinely redesign projects to avoid adversely affecting historic features and mine sites. The avoidance alternative is especially viable for large-scale projects such as timber harvest and prescribed burning.

EXPLORING MITIGATION STEPS AND ACTIONS

Projects that have little design flexibility and are targeted at specific mine features, including abandoned mine reclamation and watershed restoration, will often require both design modification (i.e., in-place stabilization of some waste rock to avert harming a load-out or adit) and other mitigative steps to lessen adverse effects. In a few instances, archaeological data recovery may be conducted to garner "Criterion D value" information from an affected historic mine property or feature (i.e., miner's cabin, historic dump).

Exceptional mining sites, either having excellent physical integrity or strong associated values will require a concerted exploration and documentation of project alternatives. Depending on the nature of the project, these efforts may ameliorate project impacts and should attempt to realize some long-term historic preservation benefits for the site (i.e., in the case of mine reclamation: cleanup of non-historic debris, structure stabilization, and interpretation).

Sites of lesser integrity and historical importance (though National Register eligible) may require less intensive exploration and documentation of project alternatives depending on the type of project involved. For example, during mine reclamation, in-filling a partially collapsed adit with waste rock for human safety reasons may be a viable alternative to leaving it alone or covering it with metal grating, provided that other site features are left intact. A new stock tank within the boundaries of a mine site may be an acceptable intrusion without any project redesign considerations in view of a site's lack of buildings or structures. Road modifications and similar improvements may likewise require a limited investment of time exploring management options given their level of potential effect on a site's National Register qualities. Site recordation through written and photographic documentation is required when all other management options have been considered and eliminated.

USING MEMORANDUMS OF AGREEMENT

Finding of effect and site treatment/mitigation considerations may be documented for SHPO and/or ACHP consultation in several ways (see the ACHP guidebook, "Preparing Agreement Documents", 1989). A letter describing project effects and treatment (and an accompanying two-party MOA) may be appropriate for projects such as hazardous mine opening closures or range improvements (water developments). More complex projects, including mine reclamation, utilities (power-line construction), and timber harvest, may require a "case report" describing the project, project Alternatives, and their viability in terms of historic preservation treatments. However, because this Plan establishes certain expectations about the amount of work investment and project scope, few projects should require the level of case report documentation required under standard Section 106 procedures.

RECORDATION: In many cases, the initial site recording may be adequate mitigation when supplemented with additional photography; e.g., cleanup of mill tailings. In other words, rather than documenting a site twice, once to identify and evaluate it and then to record it after impacts are identified, the initial evaluative report may stand as adequate recordation for mitigation.

DATA RECOVERY: Data recovery of information and artifacts will also be completed as necessary if criterion D archaeological values are present and would be affected by the undertaking. Two-Party or Three-Party MOA(s) should contain mitigation and/or treatment measures commensurate with the qualities of the historic property and the nature of the undertaking's effect on that property.

NO ADVERSE EFFECTS: Some projects may not adversely affect historic mining sites, as determined through the application of effect criteria in 36 CFR 800.9 (c) (1-3). For example, a small-scale power-line, road improvement or small-scale waste rock repository in a National Register eligible mine site may not be inconsistent with its industrial character. Range land improvements (stock tanks) may likewise be compatible with the historical use of the area while the mine was in operation. These findings of no adverse effect will be submitted to the SHPO for their review, as per 36 CFR 800.8 (a). The project may proceed when this consultation is completed.

Adverse Effect Three-Party Agreements

A Three-Party MOA will be executed among the agency, SHPO and ACHP for non-routine interstate projects, or projects which involve National Historic Landmarks or National Register properties of national significance, highly controversial undertakings, or undertakings whose adverse effect cannot be satisfactorily avoided, minimized or mitigated. One example would be a proposal to open-pit mine or include in a land exchange a significant and popular historic mine site such as Elkhorn. Such projects will probably be few and easily surfaced but the annual program review and monitoring should ensure that such projects are recognized and handled under a Three-Party Agreement.

Management Assistance

A variety of resources are available to assist in the definition of mining property types, evaluating their National Register significance, and determining appropriate mitigation and treatment At the national scale, these reference documents include National Register Bulletins 15 and 42. National Register Bulletin 42 is attached as Appendix D.

Although this document provides considerable information about the development and early character of mines, less is known about the current condition of mining properties across the state. Indeed, an assessment of the current condition of mining properties was beyond the scope of this task, and is ever changing. As a result, we cannot propose detailed recommendations for managing all mining properties in Montana.

A proactive management program necessarily requires that current status of properties be identified in advance, followed by development of a programmatic approach for managing such properties. This, in turn, would require that additional funding be made available to actually examine (i.e., record and photograph) and evaluate the condition of Montana mines on a district-by-district basis.

These management recommendations are intended to be largely proactive in nature. They provide a means for evaluating the significance, integrity, and effect of Federal and State undertakings on mining properties found on public lands. More to the point, they are to be used to evaluate project-specific impacts on such properties.

THE EVALUATION OF HISTORIC MINING RESOURCES FOR NATIONAL REGISTER OF HISTORIC PLACES ELEGIBILITY

The three Domain areas listed in the preceding chapter will help us view what mining related properties that remain in light of the management strategies discussed here. Consistent with 36 CFR 800.9(a), we have developed guidelines for managing Montana's mines. In particular, we focus on (1) mine integrity, (2) NRHP eligibility of mines, (3) potential effects of undertakings on mines, and (4) recommended strategies for mitigating effects on mines.

Integrity

The integrity of mines must be evaluated in a manner consistent with 36 CFR 800.9(a), Bulletin # 42. Prior efforts at defining the integrity of mines have emphasized the extent to which contemporary mines:

1. Have largely retained their earlier characteristics

2. Contain structures or equipment (e.g., head frames, adit construction methods, etc.) illustrating technologies from earlier periods

3. Continue to operate in settings reminiscent of those from earlier times

4. Have been operated for long periods of time

5. Have remained critical to local economic endeavors

In terms of specific recommendations, it is possible to evaluate the overall integrity characteristics of mining properties identified here. Specifically,

Prospects - retain their earlier characteristics, but rarely contain equipment illustrating early mining technology. Further, most are no longer in operation. As a consequence,

it must be concluded that these mine structures exhibit little integrity relative to other structures or buildings of mines

Past or intermittent producers - retain their earlier characteristics and may contain remnants of early mining technology. Most are no longer in operation, although they may have operated for long periods of time. As a consequence, these mines have relatively high potential integrity.

Depending on when they came into operation, reopened mines may retain their early characteristics. Depending on the extent to which they have been modified, they may contain evidence of early mining technology, were operated for long periods of time. Accordingly, these mines offer perhaps the highest potential integrity, although this may be offset to a certain extent by the fact that these mines may not be NRHP-eligible because of their recent age.

NRHP Eligibility

Eligibility refers here to the eligibility of historic mining properties for inclusion on the National Register of Historic Places under provisions of the National Historic Preservation Act (1966). Criteria for including mines on the National Register are well established and include analyzing mining operations in terms of variability in location, design, setting, materials, workmanship, feeling, and association. We recommend that tentative criteria be established that are consistent as possible with the provisions of 36 CFR 800.8(a).

With respect to mines, it is likely that eligibility determinations will require a broad range of information including:

a. Age of the mine - how long the mine has been in operation

b. Characteristics of the mine - current engineering characteristics

c. Integrity of the mine - to what extent has the mine already been extensively remodeled or reengineered?

d. Extent to which the mine exhibits elements (e.g., specific devices, original excavations, etc.) of earlier mining technologies

These factors also directly affect data collection and management strategies discussed in more detail below

Prospects - vary greatly in age so that it is difficult to evaluate their NRHP eligibility. The only alternative is to invoke the 50-year criterion to establish their possible eligibility. Older prospects tend to retain their engineering characteristics and exhibit

minimal remodeling. Again, the very nature of prospects militates against the presence of early mining technologies. Assuming that prospects are more than 50 years old, most will exhibit positive values on characteristics and remodeling; 2 out of 4 eligibility criteria

Past or intermittent producers - also very greatly in age so that their potential eligibility must rely initially on whether they are greater than 50 years old. Assuming that they are more than 50 years old, they are likely to exhibit characteristics of early mining engineering and little or no evidence of later remodeling. At the same time, the practice of stripping mines of equipment and structures once operations were abandoned adversely affects the eligibility of these mines with respect to evidence of early mining technology. Assuming that past or intermittent producers are more than 50 years old, most will exhibit positive values on characteristics and remodeling, with slightly lower scores on the evidence of early mining techniques depending on the extent to which operations were stripped once mining was halted. As a consequence, these mines will generally have positive values on 4 out of 4 eligibility criteria.

Producers/developed deposits/temporarily closed operations, may not be of sufficient age to warrant inclusion on the National Register of Historic Places. Depending on when they came into operation, some may retain remnants of their early character. Their general integrity will vary depending on the extent to which they have been remodeled. Finally, depending on the extent of remodeling, they also may retain some evidence of early mining technology. In general, these mines are less likely to eligible for inclusion on the NRHP compared with closed mines primarily because of their age. As a result, these mines will probably have positive values on 3 out of 4 eligibility criteria.

Effect

Consistent with 36 CFR 800.9(a), finding of effect require that agencies evaluate undertakings in terms of their effect on the integrity of location, design, setting, materials, workmanship, feeling or association. Adverse effects occur when (36 CFR 800(b)(1-5)) properties are:

1. Destroyed, damaged, or altered

2. Isolated from their setting

3. Subject to introduced visual, audible or atmospheric elements out of character with the property

4. Neglected so that the property deteriorates or is destroyed.

Based on prior studies, we suggest that effects on contemporary mining operations may involve one or more of the following:

1. Replacing or upgrading mining equipment (i.e., altering the technology of mining)

2. Reengineering of the mine itself (e.g., expanding open-pit mines, excavation of new shafts, etc.)

3. Neglect resulting from abandonment;

This list is by no means comprehensive, but does include the kinds of modifications that are routinely described in existing literature about Montana's mines. Using these criteria, property types identified here may be tentatively evaluated with respect to potential effect as follows:

Prospects, are rarely destroyed, isolated, or exposed to elements (visual, audial, etc.) inconsistent with their original setting. Indeed, the very nature of this type of mine is such that they are rarely affected by these factors. At the same time, these mines have so little infrastructure that neglect rarely causes the deterioration or destruction of these property types. Yet, since prospects are also safety hazards, remediation usually consists of simply backfilling the prospect. While this alters the character of the property type, the effect is relatively minimal. As a consequence, adverse effects to these mine structures will generally be minimal.

The normal process of mine closure - stripping of equipment, structures, and so forth, adversely affected past or intermittent producers. With a few exceptions, most of these activities occurred many years ago. This property type generally remains part of its original setting with characteristics (visual, audial, etc.) consistent with this setting. Subsequent adverse effects revolve primarily around neglect causing further deterioration of each property's integrity. Yet, once the mines have been closed and equipment stripped, they tend to become more-or-less stable with regard to deterioration. Foundations are often constructed of cobbles or concrete and remain largely intact. Some classes artifacts undergo normal process of decay (e.g., metal items), while others (e.g., glass and ceramics) remain largely unaffected by neglect. Overall, then, artifact assemblages associated with these properties tend to remain stable over long periods following closure. As a result, later activities (e.g., bulldozing) offer the potential to cause significant adverse effects to the integrity of these mines.

Producers or intermittently closed mines, exhibit the highest degree of integrity compared to other types of mines. Depending on the age of these operations, undertakings of almost all kinds will adversely affect this property type to a much greater extent than other property types.

Effect Determination and Data Collection

We should all develop as part of this project a weighting system for each of these criteria so that scores for specific criteria can be multiplied and undertakings at mines assigned a "effect score." The system will be based on (1) the extent of proposed modifications, ranging from a single part of a mine to mine-wide modifications, and (2) the magnitude of proposed modifications ranging from destruction (worst), damage (moderate) or alterations (best) to the existing mine. A diagrammatic representation of this weighting scheme is shown in Figure V-1 below with lower scores indicating lower effect and higher scores indicating higher effects.

Figure V-1
Matrix for Weighting Effects to Mining Properties.

		MAGNITUDE			
		Replace in Kind 1	Replace w/New 2	Abandon 3	Destroy 4
EXTENT	Single Point	1	2	3	4
	Multiple Points	2	4	6	8
	Entire Mine	3	6	9	12

Mine Management Priorities

Priorities for managing Montana's mines can focus either on individual properties (i.e., distinct mines) or on groups of properties organized into recognized mining districts. The following discussion focuses on these two approaches for managing mine-related cultural resources in the state.

As indicated elsewhere, not all regions across Montana contain equally large or significant numbers of individual properties, some of which may be NRHP eligible. Accordingly, management needs for individual properties in distinct areas can be prioritized using a two pronged approach. First, each region can be ranked in terms of their potential importance with regard to mining properties by focusing primarily on the relative proportions of past producers. Second, areas also can be ranked in terms of the occurrence of significant mining properties as identified in Chapter 3 of this document. The product of these two rankings can then generate an overall significance ranking for individual mining properties in each district.

Discussions presented in Chapter 3 have identified potentially significant NRHP eligible mining districts. These districts, any one of which may contain varying

numbers of individual mines, could also form the basis for an integrated approach to managing Montana's mines, particularly when active operations have ceased and most of the mining properties have effectively become historic archaeological entities. As with individual properties, the overall number of districts listed on the State and/or National Register of Historic places is quite small.

In summary, the purpose of this document has been to provide a general overview of the history of mining in Montana. To this end, CRABS sources, and other unpublished source materials have been synthesized to provide such a systematic review of the origin, character, and developmental sequence of mining in Montana.

While the broad sweep of Montana's mining history can be sketched out, this review makes clear that this rich mining history in some areas has been poorly documented. Given the rate of destruction of these properties, due to natural processes of decay and casual collecting, it is imperative that we seek funding to increase the rate at which these properties are studied.

This document also makes clear that the age, overall quantities and diverse character of hard-rock mines in Montana require that mining properties receive much greater attention than what has been demonstrated thus far. While there certainly are locally and regionally significant properties and districts in our regions, efforts to inventory properties or districts in these seven areas (which contain hardrock or placer mines) will capture many of the significant hard-rock mining properties that contributed to Montana's rich cultural heritage.

Friends of Montana Mining History

Immediately upon adoption of this plan, participating agencies will invite public participation in the protection, promotion and appreciation of historic mining properties in Montana through the creation of a non-profit organization devoted to those ends.

Appendix
A

Regions and the Mining Districts that they contain

Mining District	County Located In	Region/s
LITTLE ROCKIES	Phillips	1
BEARPAW	Blaine/Hill/Choteau	1 & three
NEIHART	Cascade	3
GOLD BUTTE	Liberty	3
WEST BUTTE	Toole	3
CONE BUTTE	Fergus	4
NORTH MOCCASIN	Fergus	4
WARMSPRINGS	Fergus	4
JUDITH	Judith Basin	4
RUNNING WOLF	Judith Basin	4
YOGO	Judith Basin	4
BARKER-HUGHSVILLE	Judith Basin	4
BEAVER CREEK	Meagher	4
CASTLE MOUNTAINS	Meagher	4
DEEP CREEK	Meagher	4
MURRAY	Meagher	4
MUSSELSHELL	Meagher	4
SMITH RIVER	Meagher	4
CLARKFORK	Carbon	5
HELLROARING	Carbon	5
SILVER RUN	Carbon	5
COWLES	Park	5
CRAZY MOUNTAIN	Park	5
CREVASSE	Park	5
GALLATIN	Park	5
HORSESHOE	Park	5
JARDINE-CREVASSE	Park	5
LIVINGSTON	Park	5
NEW WORLD	Park	5
NYE	Stillwater	5
STILLWATER	Stillwater	5
YELLOWSTONE RIVER	Stillwater	5
BIG TIMBER CANYON	Sweetgrass	5
BOULDER RIVER	Sweetgrass	5
NATURAL BRIDGE	Sweetgrass	5
WEST STILLWATER	Sweetgrass	5

Mining District	County Located In	Region/s
INDEPENDENCE	Sweetgrass/Park	5
HOG HEAVEN	Flathead	6
STAR MEADOW	Flathead	6
ELMO	Lake	6
CABINET	Lincoln	6
LIBBY	Lincoln	6
RAINY CREEK	Lincoln	6
SYLVANITE	Lincoln	6
TOBACCO RIVER	Lincoln	6
TROY	Lincoln	6
WOLF CREEK	Lincoln	6
CEDAR CREEK	Mineral	6
DENEMORA	Mineral	6
IRON MOUNTAIN	Mineral	6
KEYSTONE	Mineral	6
ROCK ISLAND	Mineral	6
ST.REGIS	Mineral	6
CLINTON	Missoula	6
COLOMA	Missoula	6
COPPER CUFF	Missoula	6
CRAMER CREEK	Missoula	6
ELK CREEK	Missoula	6
MISSOULA	Missoula	6
NINEMILE CREEK	Missoula	6
PETTY CREEK	Missoula	6
POTOMAC	Missoula	6
SEELEY	Missoula	6
WOODMAN	Missoula	6
BITTERROOT	Ravalli	6
BURNT FORK	Ravalli	6
CURLEW	Ravalli	6
EIGHTMILE	Ravalli	6
HUGHES CREEK	Ravalli	6
MINERAL POINT	Ravalli	6
NORTH BITTERROOT	Ravalli	6
PLEASANT VIEW	Ravalli	6
SAPPHIRE	Ravalli	6
SLATE CREEK	Ravalli	6
SULA	Ravalli	6
THREEMILE	Ravalli	6
BLUE CREEK	Sanders	6

Mining District	County Located In	Region/s
CAMAS PRAIRIE	Sanders	6
PLAINS	Sanders	6
PROSPECT CREEK	Sanders	6
REVAIS CREEK	Sanders	6
SEEPAY CREEK	Sanders	6
SILVER BUTTE	Sanders	6
SPRING GULCH	Sanders	6
THOMPSON RIVER	Sanders	6
TROUT CREEK	Sanders	6
WHITE PINE	Sanders	6
FROG POND BASIN	Granite/Ravalli	6 & seven
CONFEDERATE GULCH	Broadwater	7
HELLGATE	Broadwater	7
LONE MOUNTAIN	Broadwater	7
MAGPIE GULCH	Broadwater	7
MAGPIE GULCH	Broadwater	7
PARK	Broadwater	7
RADERSBURG	Broadwater	7
WINSTON	Broadwater	7
BLUE EYED NELLIE	Deerlodge	7
FRENCH GULCH	Deerlodge	7
GEORGETOWN	Deerlodge	7
HEBER	Deerlodge	7
OROFINO	Deerlodge	7
ALPS	Granite	7
ANTELOPE CREEK	Granite	7
COMBINATION	Granite	7
DUNKLEBURG	Granite	7
GARNET	Granite	7
MAXVILLE	Granite	7
PHILIPSBURG	Granite	7
RED LION	Granite	7
ROCKCREEK	Granite	7
ROSE MOUNTAIN	Granite	7
SILVER LAKE	Granite	7
SOUTH BOULDER	Granite	7
WELCOME CREEK	Granite	7
ALHAMBRA	Jefferson	7
AMAZON	Jefferson	7
BASIN	Jefferson	7
BEAVER GULCH	Jefferson	7

Mining District	County Located In	Region/s
BIG FOOT	Jefferson	7
BOULDER	Jefferson	7
CATARACT	Jefferson	7
CLANCY	Jefferson	7
COLORADO	Jefferson	7
ELK PARK	Jefferson	7
ELKHORN	Jefferson	7
ELKHORN	Jefferson	7
HIGH ORE	Jefferson	7
LITTLE PIPESTONE	Jefferson	7
LOWLAND	Jefferson	7
MCCLELLAN	Jefferson	7
MONTANA CITY	Jefferson	7
NEZ PERCE	Jefferson	7
PIPESTONE	Jefferson	7
WHITEHALL	Jefferson	7
WHITETAIL	Jefferson	7
HOMESTAKE	Jefferson/Silver Bow	7
AUSTIN	Lewis & Clark	7
BLUE CLOUD	Lewis & Clark	7
GOULD-STEMPLE	Lewis & Clark	7
HEDDLESTON	Lewis & Clark	7
LINCOLN	Lewis & Clark	7
MARYSVILLE	Lewis & Clark	7
MISSOURI RIVER	Lewis & Clark	7
OPHIR	Lewis & Clark	7
RIMINI	Lewis & Clark	7
SCRATCHGRAVEL HILLS	Lewis & Clark	7
WOLF CREEK	Lewis & Clark	7
YORK	Lewis & Clark	7
HELENA	Lewis & Clark/Jefferson	7
BIG BLACKFOOT	Powell	7
BOB MARSHALL	Powell	7
ELLISTON	Powell	7
EMERY	Powell	7
FINN	Powell	7
GARRISON	Powell	7
OPHIR	Powell	7
OROFINO	Powell	7
PIONEER	Powell	7
RACETRACK	Powell/Granite	7

Mining District	County Located In	Region/s
BASIN CREEK	Silver Bow	7
BUTTE	Silver Bow	7
DIVIDE CREEK	Silver Bow	7
FLEECER MOUNTAIN	Silver Bow	7
GERMAN GULCH	Silver Bow	7
HIGHLAND	Silver Bow	7
MELROSE	Silver Bow	7
MOOSE CREEK	Silver Bow	7
MEDICINE LODGE	Beaverhead/Deerlodge	7 & eight
THREE FORKS	Broadwater/Gallatin	7 & eight
AJAX	Beaverhead	8
ARGENTA	Beaverhead	8
BALD MOUNTAIN	Beaverhead	8
BANNACK	Beaverhead	8
BEAVERHEAD	Beaverhead	8
BIG MUDDY	Beaverhead	8
BLACKTAIL	Beaverhead	8
BLOODY DICK	Beaverhead	8
BLUE WING	Beaverhead	8
BRYANT	Beaverhead	8
CHINATOWN	Beaverhead	8
DILLON	Beaverhead	8
ELKHORN Coolidge	Beaverhead	8
ERMONT	Beaverhead	8
HORSE PRAIRIE	Beaverhead	8
JAKE CREEK	Beaverhead	8
LOST CREEK	Beaverhead	8
MONIDA	Beaverhead	8
MOUNT TORREY	Beaverhead	8
NICCOLIA	Beaverhead	8
NOGO	Beaverhead	8
PIONEER	Beaverhead	8
POLARIS	Beaverhead	8
QUARTZHILL	Beaverhead	8
SAGINAW	Beaverhead	8
UTOPIA	Beaverhead	8
VIPOND	Beaverhead	8
WISDOM	Beaverhead	8
WISE RIVER	Beaverhead	8
RUBY	Beaverhead/Madison	8
BOZEMAN	Gallatin	8

Mining District	County Located In	Region/s
BRIDGER	Gallatin	8
ELDRIDGE	Gallatin	8
HEBGEN	Gallatin	8
WEST GALLATIN	Gallatin	8
BISMARK	Madison	8
CHERRY CREEK	Madison	8
MADISON	Madison	8
MCCARTNEY MOUNTAIN	Madison	8
NORRIS	Madison	8
NORWEGIAN CREEK	Madison	8
PONY	Madison	8
POTOSI	Madison	8
RED BLUFF	Madison	8
RENOVA	Madison	8
REVENUE	Madison	8
ROCHESTER	Madison	8
RUBY MOUNTAINS	Madison	8
SAND CREEK	Madison	8
SHERIDAN	Madison	8
SILVER STAR	Madison	8
SNOWCREST-GREENHORN	Madison	8
SOUTH BOULDER	Madison	8
TIDAL WAVE	Madison	8
VIRGINIA CITY	Madison	8
WASHINGTON	Madison	8

CROSS REFERANCE FROM AKA TO MINE DISTRICT

Also Known As	Mine District
Alder Gulch	Virginia City
Alta	Hughes Creek
Antelope Creek	Lost Creek
Apex	Nogo
Armstead	Chinatown
Backer	Confederate Gulch
Bald Butte	Marysville
Baldy Mountain	Bald Mountain
Bald Mountain	Washington
Barton Gulch	Virginia City
Basin-Cataract	Cataract
Battle Creek	Murray
Bear Creek	Garnet
Bear Gulch	Jardine-Crevasse
Bear Gulch	Rimini
Bear Gulch	Tidel Wave
Bearmouth	Garnet
Beaver	Deep Creek
Beaver Creek	White Pine
Beaver Creek	Winston
Beaverhead	Bloody Dick
Belknap	Seepay Creek
Big Elk	Denemora
Big Hole	Wisdom
Big Pipestone	Pipestone
Birch Creek	Utopia
Bismarck	Bismark
Bivin Gulch	Sheridan
Black Pine	Combination
Blackfoot	Heddleston
Blackman Hill	Big Blackfoot
Blackman Hill	Elliston
Blackmore	New World
Bobbit	Bloody Dick
Bone Basin	Renova
Boseman	West Gallatin
Boulder	Cowles
Brandon	Seepay Creek

Also Known As	Mine District
Bridger	West Gallatin
Brown Gulch	Virginia City
Browns Gulch	Butte
Browns Lake	Lone Mountain
Buffalo Creek	Clancy
Buffalo Gulch	Finn
Burns	Prospect Creek
Cabin Creek	Medicine Lodge
Cabinet	Silver Butte
Cable	Georgetown
Cable Mountain	Red Lion
Callahan	Troy
Callahan Creek	Troy
Camp Creek	Melrose
Canton	Confederate Gulch
Canyon Ferry	Missouri River
Cardwell	Whitehall
Carter	Keystone
Carter Creek	Dillon
Cataract	High Ore
Cedar Hollow	Renova
Cedar Plain	Radersburg
Champion	Orofino
Chico	Emery
Chief Cliff	Elmo
Cleek	South Boulder
Colorado	Chinatown
Colorado	Rimini
Comet	High Ore
Cooke City	New World
Coolidge	Elkhorn
Copperopolis	Musselshell
Corbin	Colorado
Crevice	Crevasse
Crow Creek	Radersburg
Curry	Emery
Danielsville	Racetrack
Dark Horse	Beaverhead
Dayton Creek	Elmo
Deadwood	Orofino
Deep Canyon	Curlew
Deer Creek	St. Regis

Also Known As	Mine District
Diamond City	Confederate Gulch
Dixon	Revais Creek
Dry and Wet Georgia Gulches	Tidel Wave
Dry Boulder Creek	Tidel Wave
Dry Cottonwood	Orofino
Dry Creek	Lost Creek
Dry Gulch	York
Dry Wolf	Running Wolf
Eagle	White Pine
East Couer d'Alene	Keystone
East Rampart Mountain	Elk Park
Elk Creek	Beaver Creek
Ermont	Argenta
Fairwether	Virginia City
First Chance	Garnet
Fish Creek	Highland
Fish River	Cabinet
Fisher River	Cabinet
Flathead	Hog Heaven
Flint Creek	Philipsburg
Fool Hen	Gould-Stemple
Fred Burr Lake	Red Lion
Frying Pan	Dillon
Gilt Edge	Warmsprings
Gird Creek	Maxville
Gladstone	Wolf Creek
Glendale	Bryant
Golconda	Alhambra
Gold Creek	Pioneer
Gold Creek	Rose Mountain
Gold Hill	Warmsprings
Goodrich Gulch	Tidel Wave
Granite	Philipsburg
Granite Creek	Virginia City
Grass Valley	Scratchgravel Hills
Greenhorn	Austin
Gregory	Colorado
Grouse Mountain	Troy
Hassel	Park
Haystack	Cowles
Hecla	Bryant
Hellgate	Magpie Gulch

Also Known As	Mine District
Helmville	Big Blackfoot
Henderson	Combination
Heron	Blue Creek
Hidden Lake	Red Lion
Highland	Basin Creek
Highland	Virginia City
Horse Prairie	Chinatown
Hot Springs Creek	Red Bluff
Independence	Butte
Independence	Cowles
Indian Creek	Park
Indian Creek	Seepay Creek
Iron Rod	Silver Star
Jackson	Saginaw
Jardine	Crevasse
Jeff Davis	Horse Prairie
Jefferson	Cataract
Jefferson Gulch	Finn
Johnson Basin	Blue Eyed Nellie
Judith	Yogo
Judith Mountain	Judith
Junction	Virginia City
Keep Cool Creek	Lincoln
Kendall	North Moccasin
Kennedy Creek	Ninemile Creek
Kila	Hog Heaven
Landusky	Little Rockies
Last Chance	Helena
Lemhi Pass	Bloody Dick
Lewis and Clark	Austin
Lewis and Clark	Rimini
Liverpool Creek	Lincoln
Lolo	Woodman
Lost Child	Butte
Lost Cloud	Polaris
Lothrop	Petty Creek
Lower Hot Springs	Norris
Lower Hot Springs	Red Bluff
Lump Gulch	Clancy
Lupfer	Star Meadow
MaCarthy	McCartney Mountain
Magpie Gulch	Hellgate

Also Known As	Mine District
Maiden	Warmsprings
Mayflower	Renova
McAllister	Washington
McCarty	McCartney Mountain
McClellan Creek	Lincoln
Meadow Creek	Washington
Middle Fork of Judith River	Jardine-Crevasse
Mill Creek	Emery
Mill Creek	Heber
Mill Creek	Seepay Creek
Mineral Hill	Pony
Mitchell Creek	McClellan
Mommoth	South Boulder
Montana	Argenta
Montana	Neihart
Monument	Saginaw
Mount Powell	South Boulder
Mountain Horse	Prospect Creek
Mulchy Creek	Beaverhead
Nevada	Virginia City
Odell	Minida
Olson Gulch	Blue Eyed Nellie
Ontario	Elliston
Ottawa	Marysville
Overwich	Hughes Creek
Owyhee	Helena
Pine Grove	Virginia City
Poorman	Gould-Stemple
Potomac	Coloma
Powell	Elliston
Prickley Pear Creek	Colorado
Princeton	South Boulder
Prospect	Horse Prairie
Prospect Creek	Seepay Creek
Quartz Creek	Cedar Creek
Quartz Hill	Seepay Creek
Quartz Hill	Vipond
Rabbit	Rochester
Ramshorn	Seepay Creek
Revais Creek	Spring Gulch
Rock Creek	Lone Mountain
Rocker	Butte

Also Known As	Mine District
Ruby	Lowland
Saltese	Denemora
Sarpy Creek	Prospect Creek
Seepay Creek	Revais Creek
Seven-Up-Pete Gulch	Lincoln
Sheep Creek	Smith River
Sheepeater	Jardine-Crevasse
Shorthill	Emery
Siberia	German Gulch
Silver	Heddleston
Silver Lake	Blue Eyed Nellie
Snowshoe	Libby
Soap Gulch	Melrose
South Fork of Judith River	Jardine-Crevasse
Southern Cross	Georgetown
Spring Gulch	Revais Creek
Spring Hill	Helena
Spring Hill	West Gallatin
State Creek	Big Foot
Stonewall Mtn	Lincoln
Summit	Virginia City
Summit Valley	Butte
Superior	Iron Mountain
Sweathouse	Pleasant View
Sylvanite	Rainy Creek
Ten Mile	Rimini
Tenerfoot	Smith River
Thompson Creek	Beaver Creek
Top o'Deep	Garnet
Townsend	Park
Trail Creek	Pioneer
Trout Creek	Cedar Creek
Twin Bridges	Tidel Wave
Twin Peaks	Racetrack
Unionville	Helena
Upper Hot Springs	Norris
Upper Hot Springs	Revenue
Vaughn	Rimini
Vermillion	Silver Butte
Vermillion River	Silver Butte
Wallace	Clinton
Ward	St. Regis

Also Known As	Mine District
Warm Spring	Alhambra
Warm Springs	Cone Butte
Warm Springs Creek	Blue Eyed Nellie
Washington	Finn
West Fisher	Cabinet
Wickes	Colorado
Williams Gulch	Virginia City
Willow Creek	Rockcreek
Wilmah	Bismark
Wilson-Tizier	Elkhorn
Wisconsin Gulch	Sheridan
Wise River	Elkhorn
Wise River	Wisdom
Wyman	Maxville
Yaak	Sylvanite
Yaak River	Sylvanite
Yahk	Sylvanite
Yaht	Sylvanite
Zortman	Little Rockies
Zosell	Emery

Appendix

B

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Appendix
C

GLOSSARY OF HARD ROCK MINING TERMS

This glossary was taken in whole from Handbook For the Identification of Historic Metal Mining Properties, by Dale P. Herbort of the Montana Department of State Lands, which was developed by freely borrowing the definitions provided in several texts and reference sources. The most prominent of these include; "The Elements of Mining" by Lewis and Clark, 1941; "National Register Bulletin 42 "Guidelines for Identifying, Evaluating, and Registering Historic Mining Properties" by Noble and Spude, 1992; "Abandoned Mine Land Inventory and Hazard Evaluation Handbook" by U.S. Bureau of Mines, 1993; and "Western Mining" by Young, 1970

Abandoned Mine; Abandoned Workings - Excavations, either open, caved or sealed, and associated facilities that are deserted and in which further mining is not intended.

Acid Mine Water; Acid Mine Drainage - Mine waters which contains sulfuric acid, resulting from the oxidation of sulfide ores principally iron pyrites.

Activator - A reagent that facilitates flotation of selected mineral species in a flotation cell.

Adit - A horizontal or nearly horizontal passage driven from the surface for the working of a mine. If driven through the hill or mountain to the surface on the opposite side, it would be a tunnel.

Adobe Furnace - A primitive furnace made of bricks, in which ore was smelted. The adobe furnace was used in many parts of the world before the advent of machinery and of treatment of ore on a large scale.

Aerial Tramway - A system for the transportation of ore or rock in buckets which are suspended from a continuous cable system.

Agitation - In metallurgy, the act or state of being stirred or shaken mechanically, sometimes accompanied by the introduction of compressed air.

Agitation Leaching - A method to dissolve metals by agitating the ore in special vessels with a dissolving chemical.

Air-leg - A pneumatic operated cylinder attached to a rock drill. The cylinder, with a small bore and a piston with a long stroke, supports the drill when used in drilling operations.

Air Lock - An area in the mine closed at both ends by two doors or two bulkheads with flaps or doors. An air lock is used to prevent mixing of different atmoespheres while allowing miners to enter and exit an area.

Air Shaft - A shaft used for ventilating mines, termed downcast when transferring fresh air from the surface to the underground workings and upcast when discharging exhausted air to the surface.

Amalgam - The combination of mercury (quicksilver) with one or another metals after milling, principally gold and silver.

Amalgamation- The process of bringing particles of free gold or silver in contact with mercury. The most common practice was to pass a slurry of crushed gold ore over large copper plates that had been coated with mercury. In the case of silver, a slurry mix of crushed silver ore was run through metal pans containing mercury.

Amalgation Apparatus - Numerous types of equipment were used in connection with stamp mills for amalgamation. These include:

1) Amalgamation pans.

2) Inside plates amalgamated plates inside the stamp.

3) Outside plates splash plates, lip plates, apron plates, sluice plates and shaking plates.

4) Mercury Wells and Traps - used to catch flour amalgam or larger pieces which, have been scoured from the plates. The Black Hills trap is of this type.

5) Mechanical amalgamators which do not combine crushing with amalgamation.

6) Clean-up devices - Clean up barrels, pans and retorts.

Amalgam - The soft putty of gold, silver and mercury after attachment. The amalgam is heated, or retorted, to vaporize the mercury, leaving a hard sponge-like mass of gold and silver dore.

ANFO - Blasting agents comprised of a mixture of ammonium nitrate and fuel oil.

Apex - The top or terminal edge of the vein on the surface or its nearest point to the surface (blind apex). The apex is the point from which the vein has a dip and strike, otherwise no extralateral rights could be conferred by the apex.

Arrastra - A primitive mill using a circular **path of cobble stones with** retaining walls on either side. Heavy drag stones were drug over the mixture of ore and mercury using a horse, water wheel or steam for power. As the ore was crushed the free gold was amalgamated. The amalgam was then dug from between the cobblestones. Arrastras were in common use in the western and southwestern United States in the 18th and 19th centuries.

Assay - (Verb), To test ores or minerals by chemical or other methods for the purpose of determining the amount of valuable metals contained.

Assay - (Noun), The content, type or quality of metal in an ore as tested or assayed by an experienced assayer using various methods including fire assay or acid tests. Assay offices often purified precious metals prior to shipment to the mint.

Assessment Work - The amount of work specified by law which must be done each year to retain legal control of mining claims.

Auriferous - Earth that contains particles of gold, or gold in combination with some other mineral.

Autogenous Grinding - The process of grinding ore in a rotating mill which uses large pieces, or pebbles of the ore being ground, instead of conventional steel balls or rods as a grinding medium.

Azurite - A blue colored carbonate of copper.

Back - The ceiling of a drift, crosscut or stope.

Backstope - The initial lift or slice when commencing to stope or mine from a drift.

Ball Mill - A rotating horizontal cylinder in which nonmetallic materials are ground using various types of grinding media such as quartz pebbles, porcelain balls or steel balls. Although many types of quartz pebbles could be used, flint nodules from the fields of Norway, Denmark and England were preferred.

Barricade - An enclosure in part of the mine to prevent the inflow of noxious gases from A mine fire or explosion. This is done by building one or more airtight walls from material such as rock, wood, brattice cloth, mud, et cetera, which encloses a maximum quantity of good air

Barring, or Bar Down - The act of cleaning the walls and roof of a mine, removing loose rock with a long steel bar.

Barren Solution - Leaching solution that has been chemically stripped of metal values. Typically, the barren solution is recharged with leaching a agent and recycled.

Barricade - An enclosure in part of a mine to prevent the inflow of noxious gases from a mine fire or explosion. This is done by building one or more airtight material walls such as rock, wood, brattice cloth, mud, etc., which encloses a maximum quantity of good air.

Base metal - Metals such as copper, lead, zinc and other common industrial varieties.

Bedded deposit - An ore deposit of tabular form that lies horizontally or only slightly inclined to the horizontal and that is commonly parallel to the stratification of the enclosing rocks.

Bedrock - The solid rock that underlies soil or gravel.

Beneficiation - The initial process of upgrading ores for the purpose of: 1) regulating the size of a desired product; 2) removing unwanted constituents; and 3) improving the

.quality, purity, or assay grade of a desired product.

Bit - The part of a drill that comes into contact with and actually cuts or chips the rock. Bits may be formed directly on the drill steel or may be detachable.

Blast - An explosion or violent detonation caused by the discharge of dynamite or other explosive material.

Blast Furnace - A columnar furnace in which mixed charges of oxide ores, fluxes and fuels are blown with a continuous blast of hot oxygen enriched air for the chemical reduction of metals to their metallic state. Iron ore is most commonly treated in this way as well as some ores of copper and lead.

Blasting Cap - An enclosed metal shell containing a charge of detonating compound which is ignited by an electric current or the spark of a fuse. Used for detonating high yield explosives.

Blasting Gelatin - A high yield explosive consisting of nitroglycerin and nitro-cotton. It is a rubber-like elastic substance unaffected by water.

Blasting Machine - A portable device that generates enough electric current to detonate electric blasting caps.

Biennia - An ore of zinc, consisting of zinc and sulphur.

Blister Copper - The product of the Bessemer converter furnace used in copper smelting. It is a simple form of copper, assaying about 99% copper, and further refining is required before being used for industrial purposes.

Block Caving - A method of mining in which large blocks of ore are undercut causing the ore to break and cave under its own weight.

Blossom Rock - Float ore that has decomposed from outcroppings.

Bonanza - The discovery of rich ore.

Bornite - A mineral combination of copper with sulpur and iron that forms one of the richest copper ores, also known as peacock copper.

Borrasca - The opposite of bonanza; in Spanish, "barren rock."

Box Hole - A short raise or opening driven above a drift for the purpose of drawing ore from a stope, or to permit access.

Brattice - A partition in any mine passate to confine or redirect the air flow.

Breast - A working face, usually restricted to a stope.

Breastboard - Temporary timber lagging placed horizontally across the face of a heading to prevent or check the flow of loose, sand-like material.

Bridge Piece A timber placed directly above the set cap. the objective is to keep the ground weight directly off the cap.

Bucket - In mining, an enlarged metal or wooden bucket used to haul materials out of a mine shaft. It is sometimes used to carry miners.

Building Tables, Buddles - Stationary washers of fine slimes in which the slope is so gentle that the ore gradually builds up until a bed 10-12 inches deep accumulates. The washing is then stopped and the products cleaned out. The building up of sands is regulated by adjusting the tailboards which prevent the ore from rolling off the table.

Bulkhead - A seal of either concrete or wood to close prior or abandoned workings.

Bullion Precious metals in bars, ingots or other uncoined form.

Cage - A vehicle that rode on guides in the shaft, that was moved up and down by the hoisting engine and was used for hauling men, supplies and ore.

Canvas Tables - Inclined rectangular tables covered with canvas for the washing of fine slimes. Pulp is fed at the **head** end and flows down over the canvas surface. When the meshes have become filled, the flow of concentrated is stopped and hosed off.

Cap - The uppermost heavy timber in a set, usually at right angles to the line of the drift and at right angles to the foot and hanging walls.

Carbonate - A chemical compound with carbon dioxide. Carbonates of metals are often found in the upper portions of ore bodies.

Carbon Column - A columnar tank containing Activated charcoal in which metal values are adsorbed by the charcoal from a pregnant leach solution circulated within.

Carbon-in-Leach.- A recovery process in which a slurry of gold ore, free carbon particles and cyanide are mixed together. Cyanide dissolves gold from the ore and the gold is simultaneously adsorbed onto the carbon. The carbon is seperated from the slurry and the gold recovered.

Carbon-in-Pulp - A gold recovery process in a cyanide leach slurry where coarse activated carbon particles are moved countercurrent to the slurry, absorbing gold as it passes through the circuit.

Carbon Stripping - Process wherein metal laden charcoal from the carbon columns is stripped of metal values with a hot caustic solution. The stripping solution is then passed to electrowinning cells where the metals are electroplated on steel wool cathodes.

Cathode - A rectangular plate of metal producted by electrolytic refining which is melted into commercial shapes such as wirebars, billets, ingots, etc.

Caving - A mining method in which the ore is broken by induced caving. Variations include:

top slicing - A horizontal slice of ore is removed allowing the ore above it it cave. Then, leaving the slice below temporarily intact, a still lower slice is removed, allowing the intervening slice to cave;

block caving - Similar to top slicing except that the slice which is allowed to cave is of much greater thickness, and may even constitute the full thickness of the ore body;

pillar caving - ore is broken in a series of stopes or tall rooms, leaving pillars between. Eventually the pillars are forced or allowed to cave under the weight of the roof.

Cazo Process - An early Spanish process of treating silver ores, in which the ore was placed in a copper bottomed vat or kettle and boiled with salt and quicksilver to speed the process of amalgamation.

Chalcocite - The richest mineral combination of copper with sulfur. In its hard steely form it is called copper glance.

Chalcopyrite - A brass colored mineral combination of copper .with iron and sulphur.

Chilean Mill - A primitive milling system similar to an arrastre, only using a large stone or iron shod wheel in place of drag stones to nip and crush ore.

Change House - A special building constructed at a mine where the miner changes to his working clothes; also known as a "dry".

Cheek - The side or wall of a vein.

Chimneys The richer spots in lodes as distinguished from poorer ones.

Chippie Several auxiliary cages which hung below the main cage in sequence.

Chippie Hoist - An auxiliary hoist used to move miners, timber and supplies from the surface to various levels in the mine.

Chlorides - A compound of chlorine and silver.

Chlorination - A method of removing gold from its gangue by the injection of chlorine gas into milled and roasted ore.

Chute - An inclined opening usually constructed of timber and equipped with a gate, through which ore is drawn from a stope into mine cars.

Cistern - A settling tank for liquid slag, slurry or pulp.

Claim - A portion of mining land held under federal law and presumed to contain a mineral vein or placer deposit. The dimensions of a lode claim are 600 feet by 1500 feet; and for a placer claim, 600 feet by 1320 feet.

Claim Jumping - The illegal appropriation of another man's claim.

Classifier - A hydraulic device for dividing and grading sands. It generally had a series of sorting columns or vertical openings, through each of which there was a rising current of clear water and a downward flow of settling sand. By having these rising water currents graded from fast in the first sorting column to slow in the last, a series of spigot products are obtained ranging from heavy in the first to light in the last spigot. The very finest particles, referred to as slime, overflowed out the classifier.

Cleaner Cell - Secondary cells in a flotation mill for the retreatment of concentrate from the primary cells.

Collar - The term applied to the timbering or concrete around the mouth or top of a shaft. Also applied to the process of beginning to sink a shaft; i.e., "to collar" a hole.

Collector - In a flotation mill, a reagent that aids or facilitates the attraction of mineral particles to the froth in a flotation cell.

Comminuition - The reduction of solids to minute particles by crushing and grinding to liberate metal values.

Complex Ore - An ore containing a number of minerals of economic value. It usually implies an ore that is difficult to process for valuable metals.

Concentrate - A product containing the valuable metal and from which most of the waste material in the ore has been eliminated.

Concentrator/Concentration - A device and a process for reducing the values in an ore into a smaller bulk in order to diminish the expense of shipping and further treatment. Sluicing of placer ground was the earliest form. Handsorting of ore to obtain a higher grade was probably the most commonly used. In concentrating mills, the ore was crushed, screened to the proper size, and then passed over vibrating tables to separate the heavier metals from the gangue. Concentrator was the name given to the surface plants which concentrated ore into a concentrate prior to shipment to smelters.

Concentration Table - A concentrating device that uses gravity to seperate heavy from light minerals by passing finely ground ore in a thin stream of water over a sloping table while the table is being shaken with a bumping or-vibrating motion. The heavy metallic particles are forced towards one end of the table. Concentration tables include the Gilpin County Concentrator and the Rittinger Table as side and end bump types, and the Wilfrey, Butchart, and Deister Tables as vibrating or jerking types.

Conditioner - Substances added to the pulp in a flotation mill to maintain the proper pH to protect certain salts such as Potassium Cyanide that would decompose in an acid circuit.

Contact Vein - A vein along the contact plane or between two dissimilar rock masses.

Copper Glance - The hard steely form of chalcocite, a copper sulphide mineral.

Cornish Frames - An early device designed for the washing of slimes. The frames are plain rectangular wooden surfaces set at a slight slope. As the pulp flows down the frame, the lighter materials are washed away, leaving the heavier materials on the table.

Cornish Steam Pump - A very early mine pump invented by James Watt for the Cornish tin mines in Great Britain. The pump consisted of a steam engine that operated a walking beam. The other end of the beam was connected to a wooden timber that extended to the bottom of the shaft. The end of the timber was connected to a piston with check valves so the water was lifted on top of the piston. If the shaft was greater than 300 feet deep, an additional pump had to be installed, and the water in the lower section was pumped up into a sump. The top section then pumped the water from the sump to the surface. Additional walking beams were installed to act as counterweights to overcome the weight of the timber and the water column.

Country Rock - A loose term to describe the general mass of rock adjacent to an orebody, as distinguished from the vein or ore deposit itself.

Course of the Vein - Along its length.

Crib - A square, stacked piller-like framework of wooden or metal bars, filled with rock, used for support or strengthening.

Cribbing - Timber framing to retain the walls and ceiling of a adit opening or drift, and prevent loose materials from falling.

Crosscut - A horizontal opening driven from the shaft across the course of a vein or structure, or in general across the strike of the rock formations.

Crusher - A machine for crushing rock, such as a ball mill, gyratory crusher, Hadsel mill, hammer mill, jaw crusher, rod mill, rolls, tube mill, or stamp mill.

Cut - To intersect a vein; open cut, a level without a covering driven across the course of the vein.

Cut and Fill - A method of stoping in which ore is removed in slices, or lifts, and then following which the excavation is filled with rock or other waste material known as backfill, before the subsequent slice is mined. The back-fill supports the walls of the stope.

Cyanide - A salt or ester of hydrocyanic acid, either potassium or sodium cyanide, used to dissolve metal values from gangue materials for later recovery.

Cyanide Process/Cyanidation - The dissolving of gold and silver by the use of a solution of alkaline cyanide. The process was invented in Scotland in 1887, first successfully used in South Africa and New Zealand in 1890, and in the United States at Mercur, Utah in 1892. The practice consisted of fine grinding of ore in a roller, tube, rod, or ball mill. The crushed ore passed to leaching tanks where a solution of sodium or potassium cyanide was placed in the tank with the ore. The ore then gave up the silver or gold mineral into the solution. The gold was retrieved in zinc boxes (or other methods of precipitation) where the precious metals were precipated. The precipitate was finally smelted and refined into gold and silver bullion.

Cyclone; Cyclone Classifier - A device for classification by centrifugal means of fine particles suspended in water whereby the coarser grains collect and are discharged at the apex of the vessel while the finer particles are eliminated with the bulk of the water at the discharge orifice.

Decline - A drift or tunnel driven downward at an angle from the horizontal.

Depressant - In a flotation mill, a reagent that caused selected mineral species to sink in a flotation cell.

Detonating Fuse - A fuse consisting of a high yield explosive that fires the charge without the assisance of any other detonator.

Detonator - A device for producing detonation in a high explosive intiated by a safety fuse or by electricity.

Development - The work of driving openings into a proved ore body to prepare it for full-scale mining.

Differential Flotation - A milling process by which each of the valuable minerals is floated and separated from the waste constituents of the ore.

Dip - The angle at which a bed, stratum, or vein is inclined from the horizontal.

Disseminated Ore - Ore in which the metal bearing particles are sparsely scattered through a rock mass.

Dog House - Miner's slang for the small warming shacks usually placed near the mine portal.

Dore - Gold and silver bullion which remains in a cupelling furnace after lead has been oxidized and skimmed off.

Double-Jacking - Hand drilling of blast holes by two or three men. One holds the drill rod, turning it after each blow from an eight pound sledge, while the other men hammer at it with a steady rhythm.

Downcast - Intake ventilation shaft.

Drift (or Drive) - A horizontal passage in or near an ore body and parallel to the course of the vein or long dimension of the ore body, as opposed to a crosscut which crosses the vein.

Drifter - A percussion type air drill with special support mountings suited for drifting and long hole drilling operations.

Drill-Hole Nomenclature -

Cuts - holes drilled to make the initial opening in the ground.
Rakers - holes drilled to clean but and enlarge the cut.
Easers - holes drilled to enlarge the cut.
Relievers - same as easers.
Enlargers - holes drilled to enlarge an opening.
Trim - holes drilled to outline the final opening.
Back - holes drilled at the top of the round to outline the opening.
Lifters - holes drilled at the bottom of the opening to bring the heading to grade.

Drill Steel - A round or hexagonal steel rod for boring in coal, ore or rock.

Dry House or "dry" - A building where the miner changes to and from working clothes.

Dump - A pile or heap of waste rock material or other non-ore refuse near a mine.

Dynamite - An industrial explosive which is detonated by blasting caps. The principal explosive ingredient is nitroglycerin or specially sensitized ammonium nitrate.

Electrolytic Refining - The process of refining metals by casting them into anodes which are placed in an electrolyte consisting, usually, of a salt of the same metal dissolved in water. An electric current causes the pure metal to deposit on the cathode.

Similarly, an electrically inert anode will result in deposition of the metal on the cathode from a purified solution of a salt of the metal.

Electrowinning - Recovery of a metal from an ore or solution by electrochemical processes.

Enriched ore - ore in which the original metal content has been increased by the addition of more metal brought down by descending surface waters. The water leaches metals from oxidized upper portions of the ore bodies and deposits it in the lower unoxidized portions.

Exploration - The work involved in gaining a knowledge of the size, shape, position and value of an ore body.

Exposure Any part of a rock formation easily seen either in a mine or a surface outcrop.

Extralateral Right - The right of a mine owner to follow a vein down beyond his side lines under a neighbor's ground if he has the apex on his claim.

Face - The surface area exposed by excavation at the end of a passage heading, or at the end of the full size excavation.

Fault - A displacement or break of strata or veins so that they are not continuous.

Feeder - A small vein entering a large one.

Fitcher - The event in which a drill is seized in the grip of rock while being pounded for a blast hole.

"Fire In The Hole" - A verbal warning of the imminent detonation of explosives. The original use predates the advent of electical detonation systems, referring to the fuse burning into the drilled hole containing the explosives.

Fire-Setting - A process of cold mining developed by the Spanish miners where a fire was built against the face of a vein, and at the appropriate moment, cold water was dashed against the rock, breaking the ore by the action of thermal stress.

Fissure Vein - A fissure or crack in the earth's crust filled with mineral matter.

Float - Rock composed of loose pieces of ore or particles of metal and is produced and distributed by the weathering of an outcrop.

Flotation - The separation of minerals from each other and from waste matter by inducing (through the use of reagents) relative differences in their abilities to float in a frothy liquid medium. The process will separate all metallic sulfides or elemental

metals. If necessary, differential flotation can be used on complex ores. In such an ore, each sulphide mineral, such as copper, lead and zinc can be separated from the others. First patented by Carrie Jame Everson of Denver on August 4, 1686, the process was ignored until perfected in Australia at the turn of the century. The first successful plants in the United States were at Butte where in 1911 the process was introduced at the Butte and Superior zinc-lead mine and at the Inspiration Copper Mine at Miami, Arizona, in 1915. Three types of flotation processes exist.

1) Surface tension flotation - Based on the tendency that many minerals, particulary sulfide minerals, when in a fine state of division, exhibit a reluctance to be wetted by water and **tend to** float upon its surface.

2) Bulk Oil flotation Based on tendency for certain minerals to be wetted preferentially by oil in the presence of water. Once wetted by oil, they tend to form into sperules or into granules which being lighter than an equal bulk of water rise to the surface where they can be recovered.

3) Froth flotation - Based on the tendency for a mixture of oil, finely divided ore and air to rise to the surface of water. The mixture of ore, oil, water and excess air is violently agitated, forming a froth that rises to the surface of water.

Flotation Cell - Device in which froth flotation of ores is performed.

Flux - A chemical substance used in metallurgy to react with gangue minerals to form slags which are liquid at the furnace temperatures concerned, and low enough in density to float on the molten bath of metal or matte; examples range in scale from large tonnages of limestone, silica, etc. in large furnaces, to small quantities of borax, soda, etc, used in laboratory assay fusions.

Footboard - A lagging or timber placed horizontally under a post or stull in loose or very wet ground to act as a foundation for the post.

Foot Wall - The wall or rock under a vein.

Free Killing - Ores of gold or silver from which the precious metals can be recovered by concentrating methods without resort to roasting or chemical treatment.

Freiberg Process - The Freiberg process was an effective combination of chlorination and amalgamation which economized on both fuel and mercury, though at the expense of requiring more elaborate machinery than either the patio process or cazo treatment of silver sulphurets. The ore was cobbed to eliminate waste, crushed in a Chilean Mill or Blake machine, stamped to a fine flour, then mixed with 10 percent of its weight in common salt and roasted in a reverberatory furnace. The roasting drove off sulphur, arsenic, and other undesireable elements while converting the sulphurets to chlorides. The roasted ores were then introduced in 500 pound batches

to barrels of one ton capacity designed to rotate around their long axis by water or steam power. Water was injected and the barrels were rotated slowly until the ore was a paste. At that point, salts were added to reproduce the final reactions of the patio process. The barrels were run for 24 hours, then stopped and the agglomerated amalgam tapped down from the barrel and removed for retorting. The remaining contents of the barrel were run into vats and agitated in water to work off the tailings, leaving behind additional amalgam for recovery.

Friction Hoist - A mine hoist, also known as a koepe Hoist, in which conveyances are suspended from both sides of a simple friction pulley which imparts the up and down motion. It is distinct from a drum hoist in which the ropes are wound onto their individual drums.

Frother - A reagent which serves to stabilize the froth in a flotation cell until it can be scraped off into the concentrate launder.

Fuse - A core of black powder wrapped with hemp or cotton threads or tape, with various waterproofing compounds between each.

Gallowsframe - see Headframe.

Galena - Lead ore, sulphur and lead.

Gangue - The worthless minerals that are associated with the valuable minerals in an ore. As much of this gangue as possible is removed by the processes of concentrating and smelting.

Gash Vein - A vein wide above and narrow below.

Gilpin County Concentrator - A continuous working smooth table of the end-bump type set at a slight slope. A spring, cam, and a bumping post furnish the bump. The bumping action propels the ore particles up the slope, but wash water coming down the slope carries away the gangue, leaving the heavy mineral behind.

Girt (timbering) - The upper horizontal member of a timber set, parallel to the direction of the drift or strike of the vein, and which also holds the posts and caps in position.

Glance - Any of the various ores having a luster which indicates their metallic nature.

Glory Hole - A funnel shaped excavation, the bottom of which is connected to a raise driven from an underground haulage level.

Gophering - Haphazard mining of the easiest and richest parts of an ore body.

Gossan - The ferruginous deposit filling the upper part of some mineral veins or forming a superficial cover over masses of pyrite. It consists mainly of hydrated iron oxide and has resulted from the removal of sulfur as well as the copper or other sulfides originally present.

Gravity Mill - A process in which heavy metals or minerals are separated from waste by the action of agitation and gravity on materials suspended in a liquid, usually water.

Grizzly - A device for the coarse screening of bulk materials. A rugged screen for rough sizing at a comparatively large size, for example six inch diameters.

Grubstake - An agreement between the miner and a business owner whereby food, clothing, ammunition, and *mining supplies* would be furnished in exchange for a negotiated percent of return on the miner's *earnings*.

Guides - The timber rails along the sides of a shaft for the purpose of steadying, or guiding, the cage or conveyance.

Hanging Wall - The wall or rock on the upper side of an inclined vein.

Headboard - A lagging or timber place horizontally on top of a single post or stull in loose ground.

Headframe - A timber or steel structure over the shaft that supports the sheave and hoisting rope and is braced to withstand the pull of the hoisting engine. Also *known as* a "Gallowsframe."

Heading - The vein above the drift.

Headworks - The collection of buildings consisting of shaft houses, hoist houses, pump houses, offices, blacksmith shops and so *on* clustered near the shaft or adit of a mine.

Heap leach - A recovery process in which prepared ore is stacked in heaps on impervious pads and a solvent percolated through the heap to dissolve selected metal values.

Heavy Metals - Principally the metals *zinc*, copper, cobalt and lead. Sometimes the term is used to include one or more of the following metals: bismuth, cadmium, gold, indium, iron, manganese, mercury, nickel, palladium, platinum, silver, thallium, and tin.

High Grade - (noun) Rich ore; (verb), it refers to selective *mining of* the best ore in a deposit, and/or theft of choice ore by an employed miner.

Hitch - A depression or hole cut into the rock to hold timbers in place. Stulls are commonly put into a hitch so that they will stay in position.

Hoist - Any engine with a drum on which the hoisting rope is wound. The machine used for raising and lowering the cage or **other conveyance** in a shaft.

Horse - A mass of rock matter occurring in or between the branches of a vein.

Impoundment - An area often contained by a dam, used as a water supply for a mining or milling operation or as settling ponds for tailings slurries.

Incline - A nonvertical, or slanted shaft, usually along the dip of a vein.

Intake - A passage through which fresh air is drawn or forced into a mine or to a section of a mine.

Intermediate Level - A level driven from a raise or manway instead of the working shaft.

Jackhammer - A trade name in common usage for a sinker type percussion air drill.

Jaw Crusher - A primary crusher designed to reduce large rocks or ores to sizes capable of being handled by any of the secondary crushers. It consists of a moving jaw, hinged at one end, which swings toward and away from a stationary jaw in a regular oscillatory cycle.

Jerking Table - A style of bumping table that utilizes riffle grooves for seperation of light and heavy minerals.

Jig - A machine in which the feed is stratified in water by means of a pulsating motion and from which the stratified products are separately removed, the pulsating motion usually being obtained by alternate upward and downward currents of water.

Lagging - Planks or small timbers placed along the roof of a stope or drift to prevent rocks from falling, rather than to support the main weight of the overlying rocks.

Launder - A chute or trough for conveying pulp, water or powdered ore in the milling process.

Leaching - The removal of the more soluble minerals by percolating water, or extracting a soluble metallic compound from an ore by selectively dissolving it in a suitable solvent, such as water, sulfuric acid, hydrochloric acid, cyanide, etc.

Leach pad - A specially prepared area covered by an impervious liner on which ore is placed for leaching.

Leach Tank - A specially constructed wooden tank in which ore is placed for leaching.

Lead - The visible course of a vein; pronounced to rhyme with greed.

Ledge: A visible portion of rock that contains rich ore; also called a "lode".

Level - A main underground roadway or passage driven along the level course to afford access to the stopes or workings and to provide ventilation and haulageways for the removal of ore. These are commonly spaced at regular intervals in depth and are either numbered from the surface in regular order or designated by their actual elevation below the top of a shaft.

Lixiviation - A process of removing silver from refractory ores that involves the roasting and chlorination of the ore, followed by leaching with water, and finally leaching with sodium hydrosulphite and cuprous sodium hydrosulphite to precipitate the final product.

Lode - Aggregations of mineral matter containing ores in fissures.

Loose Ground - Rock that must be barred-down or supported to make an underground workplace safe. May also be called "bad ground."

Magazine, Powder Magazine - A small solidly constructed building used for the storage of explosives.

Marcy Mill - A type of ball mill differing from its ordinary counterpart in having a lower pulp line.

Malachite - A bright green carbonate mineral of copper.

Manway - An underground passage, vertical or inclined, for the accomodation of ladders, pipes and timber slides.

Matte - A rich artificial sulfide of copper, between ore and metallic copper, formed as an intermediate product in smelting.

Matrix - The rock or earthy matter containing metallic ore.

Mercury - A metal derived from cinnabar that exists in liquid form at room emperatures, hence its common name of quick silver.It has an affinity for amalgamating with gold and .silver.

Mesh - The number of openings per unit area of a screen or sieve.

Mill - A mineral treatment plant in which crushing, grinding, and further processing of ore is conducted to produce a concentrate.

Mill Run - A test of a quantity of ore after reduction.

Mine Face - The end of a tunnel, drift or exposed ore body.

Mineral Dressing - Physical and chemical concentration of raw ore into a product from which a metal can be recovered at a profit.

Mining - The process of obtaining useful minerals from the earth's crust and includes both underground and surface workings.

Misfire - Failure of a dynamite charge to explode.

Motherlode - The principal lode or vein passing through a district or a particular area.

Muck - Ore or rock that has been broken by blasting. Also used as a slang, such as "muck it out" meaning to clean it up.

Mucking Machine - A machine with a raising bucket that shovels muck forward, raising the shovel over the machine and dumping the muck into an ore car behind the machine.

Open Cut, Open Pit - A method of mining the ore in which the workings are open to the surface.

Open Stope - An underground cavity from which ore has been mined. It may be irregular in shape or may be supported by stulls or pillars.

Ore - A mineral or mineral aggregate containing precious or useful metals and which occurs in such quantity, grade and chemical combination as to make extraction commercially profitable.

Ore Bin - A metal or wooden structure used to store ore prior to shipment.

Ore Body - A solid and fairly continuous mass of ore which may include low grade ore and waste as well as high grade materials.

Ore Chute - An inclined passage, 3-4 foot on a side, for the transfer of ore to a lower level in underground workings.

Ore Deposit - A general term applied to rocks containing minerals of economic value in such amount that they can be profitably exploited. Also applied to deposites which though they may not be immediately capable of profitable exploitation, may yet become so by change in the economic circumstances that control their value.

Ore Dressing - The treatment of ore by the removal of some of the waste materials.

Oreshoot - The portion, or length, of the vein, or other ore structure, that carries sufficient valuable mineral to be profitable to mine.

Outcrop - Commonly considered the surface exposure of a mineral deposit. The uppermost part of a mineral deposit may be covered with soil or other overburden, however, and thus the outcrop may be hidden.

Overcast - Enclosed airway that permits one air current to pass over another air current without mixing.

Pack - An artificial support system made from shaped rocks, concrete or pumice blocks.

Pan - (noun) A flat bottomed metal pan used to wash the heavy gold bearing fraction from lighter materials. (verb) To wash in a pan, gravel and sand, or rock samples that have been ground to small particles, in order to seperate gold or other valuable metals.

Patent - A written title to land granted by the government after fulfilling certain obligations. A mining claim could be patented after $500 worth of work had been completed on the property. The owner is then relieved of annual assessment work, but the land is taxable.

Patio Process - Method developed by the Spanish to treat silver ores in greater volume than could be treated by the cazo process. Broken ore was spread in large circles, then crushed to a pulp and mixed with mercury by teams of horses. Because of the high exposure level to mercury, the process usually resulted in a high mortality rate for both horses and drivers.

Percussion Drill - A compressed air actuated hammer type rock drill.

Pillar - A block of solid ore or rock left in place for the purpose of supporting the stope, walls or roof in a mine.

Pillar Stope - Stoping where support for the hanging wall was by leaving pillars of ore in place.

Pitch - Inclination of an ore body or mine opening.

Pit, Exploration or Prospect - A small, usually less than ten feet deep, excavation to explore for minerals.

Pit, Surface Mine - A surface mine in unconsolidated or loosely consolidated material that is not refilled during the mining process.

Pocket - A rich spot in a vein or deposit.

Portal - The surface entrance to a drift, tunnel or adit. The portal is often constructed of wood, stone or concrete to stabilize loose stone at the mine entrance.

Post - An upright supporting member in a set of timbers.

Precious metals - Usually designated as gold, silver and platinum group metals.

Pregnant Solution - Metal laden solution resulting from a leach process.

Prospect - A mineral body the value of which has not been proved by exploration. An area examined for mineralization with no history of production. Includes shallow shafts, adits and trenches.

Prospecting - Searching for ore.

Pulp - A mixture of ground ore and water capable of flowing through suitably graded channels as a fluid.

Pyrite - A common iron sulphide mineral.

Quarry - A surficial opening or pit from which building stone, such as granite, marble, slate, etc. is extracted.

Raise - A vertical or inclined opening or passageway driven up ward from a level to connect with the level above, or to explore the ground from a limited distance above one level: After two levels are connected, the connection may be a winze or a raise, depending upon which level is taken as the point of reference

Rake - The trend of the ore body within the vein.

Reagent - A chemical or solution used to produce a desired chemical reaction; a substance used in assay or flotation.

Refractory Ores - Ores that resist the action of chemical reagents in the normal treatment processes, and which may require roasting or other means to effect the full recovery of the valuable minerals.

Refuge Chamber - An airtight, fire resistant room in a mine, specifically designed to protect its occupants from fire or poisonous gases.

Replacement Ore - Ore formed by a process during which certain minerals have passed into solution and have been carried away, while valuable minerals from the solution have been deposited in the place of those removed.

Reserves - Major ore bodies known to exist that have not yet been worked.

Retort - A device used to distill off and recover mercury from amalgam.

Reverberatory Furnace - A long flat furnace used in smelting copper concentrates. Its principal function is the slagging of gangue minerals and the production of matte.

Rib - The side of a pillar or the wall of a mine entry.

Rittinger Table - A continuous working smooth table of the side bump type. The feed pulp, which must be a classified product, enters at one corner of the high or head end of the table. The bumping action, produced by a cam and spring, separates the ore into layers of light and heavy minerals. The ore particles move across the table by jerks while the wash water, which is fed across the head end of the table, causes the lighter particles to move down slope. The combination of the two actions yields mineral particles spread out like a fan. Properly placed dividing fingers allow any desired separation of products.

Roasting - The treatment of ore by heat and air, or oxygenenriched air in order to oxidize the minerals, removing sulphur and arsenic compounds in the process.

Rockbolting - The act of consolidating roof strata by means of anchoring and tensioning steel bolts in holes especially drilled for that purpose.

Rod mill - A mill for fine grinding employing long steel rods to grind the material. Line contact rather than point contact results thereby increasing the effective grinding area per unit of steel and also reducing the tendency to crush a part of the ore to a very fine state of division.

Rolls - Crushing devices that consist of two iron or steel cylinders revolving upon shafts and acting upon a lump or ore. The revolving rollers, being held in place in their journals, act radically on the lump, gradually drawing it toward the narrowest space between them and finally breaking it by compression. Since rolls crush by direct pressure and since they are usually set to crush to a particular size so as to allow particles smaller than a set size to drop through without being subjected to further comminution, rolls are preeminent among machines for crushing to minimum fine.

Roof - The overhead part of a mine working.

Room and Pillar - A method of mining flat-lying deposits in which the mined area, or rooms, are separated by pillars of approximately equal size.

Rough Flotation Cell - The primary cell in a flotation mill. Typically, discharge from the rougher cell is directed to "cleaner" secondary cells for further treatment.

Round - The group of drill holes in a face to ensure complete breakage of the ore or rock when the holes are blasted.

Ruby Copper - A red natural oxide of copper.

Russell Process - A metallurgical process perfected in the mid1880s at Park City, Utah for the extraction of silver via a leaching process.

Scaling - The act of removing loose slabs of rock from roofs and walls.

Selvage - A thin band of earthy matter between the vein and walls.

Shaft - A vertical or inclined excavation in a mine extending downward from the surface or from some interior point as a principal opening through which the ' mine is exploited. A shaft is provided with a hoisting engine at the top for handling men, rock and supplies, or it may be used only in connection with pumping or ventilating operations. Often, the interior is timbered in such a way that each entity has its own passageway or compartment--cage, skip, manway or pipe.

Sheave Wheel - A large grooved wheel placed in the top of a headframe, over which the hoisting rope passes.

Shoot - Valuable minerals are commonly concentrated in certain portions of a vein that have one dimension much longer that the others. This shoot or chimney of ore is usually inclined to the horizontal.

Shot - A charge of explosives, or a blast.

Shrinkage Stope - A method of stoping which utilizes part of the broken-ore as a working platform and as support for the walls.

Sill - The floor or bottom of a passage in a mine; the bottom part of a timbered stope; or a piece of timber laid across a drift to hold the posts in a drift set.

Single Jacking - Hand drilling of blasting holes by one man, holding and turning the drill with one hand while hitting it with a four pound sledge held in the other hand.

Sinking - The driving or excavation of a shaft or winze.

Sinker - A hand held drill primarily designed to drill down holes.

Sinter - The heat treatment of fine ore particles to produce larger pieces for blast furnace feed.

Skip - A self dumping type of bucket used in a shaft for hoisting ore or rock.

Skip Tender - The man who loads the ore into a skip, and notifies the engineer, by means of a bell or other signal, when to hoist the skip.

Slag - The glassy residue from which metals have been removed by a smelter.

Slickens - The debris or tailings deposited by hydraulic mines or stamp mills.

Slickensides - Smooth, polished surface of walls caused by violent trituration.

Slime - Very small solid particles which are known to pass through a 400 mesh screen. Ore reduced to very fine powder and held in suspension in water so as to form a kind of thin mud.

Slurry - Fine solid particles suspended in a liquid, typically water, of a consistency that allows flow by gravity or by pumping.

Slusher - A form of mucking machine where one cable is attached to the front of a scraper and the other end is drawn around a double drum hoist then connected to a wall at the end of a drift. The hoist draws or drags the scraper blade back and forth across the muck pile.

Smelting - The chemical reduction of a metal from its ore and certain fluxes by melting at high temperatures. The nonmetallic material floated on top of the heavier metallic constituents in the molten state and remained in that position when it cooled and hardened.

Solution Pond - A pond, usually associated with heap leaching operations, used to hold either pregnant (metal bearing) or barren leach solutions.

Spitter - A short length of fuse used to ignite the timed fuses in dynamite blasting.

Square Set - A set of vertical and horizontal timbers used to provide roof support.

Square Setting - Method of supporting unusually large stopes by utilizing sets of mortised and tenoned timbers that could be fitted together in whatever combinations were necessary.

Stamp Mill - The ore to be treated by amalgamation is usually crushed and ground in a stamp mill. A stamp consists of a vertical steel stem with an iron foot or shoe that is lifted by a cam and dropped onto coarsely crushed ore. Weight is added to the stamp in the form of a bosshead, and a renewable wearing plate, the shoe. This assembly is dropped onto the ore which is fed onto a renewable stationary plate, called a die. The action is housed in a steel box called the battery box and usually five stamps in a row are included in one battery. In front of the battery box are renewable screens usually of the 20 mesh size that receive the splash from the impact. The combined stem, bosshead and shoe usually weigh 800 to 1000 pounds, The grinding capacity of each stamp is about 2 to 2.25 tons per 24 hour period.

In the case of gold ore, the discharge from the battery flows over amalgamating plates. These are copper plates usually about the width of the battery (usually about five feet wide) and 10-12 feet long. The copper sheets have a silver plating and are coated with a thin film of mercury which adheres to the silver. This allows the plates to catch particles of gold. Silver ore passes from stamps to pans for amalgamation. Stamp milling was developed in Europe during the Middle Ages and improved in California in the 1850s. The process was used throughout the precious metal mining regions of the United States initially as preparation for the amalgamation process then later for the cyanide process.

Station- The intersection of a shaft and a level where men and material were moved to and from the mine levels.

Stemming (Tamping) - The material tamped into a drill hole after the dynamite has been placed to increase the effect of the blast.

Stockpile - A pile of ore set aside for future processing.

Stope - An opening in the underground workings of a mine from which ore is mined. The width and height of the stope are determined by the size of the ore body. A stope does not include the ore removed in sinking shafts or in driving levels, drifts and other development openings.

Stoper - A type of drill used in overhead drilling for stoping and raising operations.

Stoping - The process of creating a stope by mining out a body of ore.

Stowing - A mining method in which broken waste rock is placed in a mined out zone.

Strike - The horizontal course or bearing of an inclined bed, stratum or vein; or the direction of a horizontal line in the plane of an inclined bed, stratum or vein.

stringer - A veinlet or small vein usually one of a number which collectively make up a stringer lode or stockwork.

Stulls - Wooden timbers, seven to eight feet in length, used to provide support as pillars between the hanging wall and foot wall. They are often set with a plank and wedge.

Stull Stope - An open stoping or vein where timber stulls were used to support the hanging wall.

Sulphide - A compound of sulphur with another element.

Sump - An excavation made underground to collect water, from which water is pumped to the surface or to another sump nearer the surface. Sumps are placed at the bottom of a shaft, near the shaft on a level or at some interior point. Also referencing the bottom of the shaft below the last working level.

Swing Hammer Pulverizer - Device used in crushing soft materials such as bituminous coal, asbestos, shell, etc.

Table; Vibrating or Concentrating - A rectangular table equipped with riffles that concentrates gold or heavy metals through vibration of material in a stream of water. Winfley and Bartles-Mozley are the two most common varieties.

Tailings - The gangue and other refuse material resulting from washing, concentrating or treating ground ore that is discharged from a mill.

Tailings Pond - A pond with a constraining wall or dam into which mill effluents are deposited.

Tamping - The gentle forcing and compaction of dynamite and stemming into a drill hole.

Thickener - A large round tank in a mill for the separation of solids from a solution; also the clear liquid overflowing the tank whereas the rock particles sink to the bottom.

Timber - Any of the wooden props, posts, bars, collars, lagging, etc. used to support mine workings.

Timbering - The operation of setting timber supports in a mine.

Toplander - The man who handles ore cars at the surface of an underground mine.

Tram - A small wagon or container for carrying minerals, or a boxlike wagon running on a tramway or railway in a mine.

Tramway - An established system of roads, rails or cables over which ore is moved from the mine to the mill. .

Trench - A long, narrow excavation dug through overburden, or blasted out of rock, to expose a vein or ore structure.

Trend - The general direction or bearing of a vein, ore shoot, fault or rock outcrop.

Trommel - A revolving cylindrical screen **used in grading** coarsely crushed ore. The material to be screened is delivered inside the trommel at one end. The fine material drops through the screen holes and the coarse is delivered out at the other end. Also called in accordance with its various uses, sizing trommel, washing drum and washing trommel.

Tube Mill - An apparatus consisting of a revolving cylinder about half filled with steel rods or balls and into which crushed ore is fed for fine grinding.

Tugger Hoist - A small, air-operated hoist often used underground for hoisting timber and other mining supplies.

Tunnel - A horizontal, or nearly horizontal, underground passage that is open to the atmosphere at both ends.

Vanners - Devices used as both fine sand and slime concentrators. Vanners do their work on the upper surface of an endless belt which is slightly inclined from the horizontal and receives a rapid shake in the plane of the belt for stratifying the pulp. This agitation makes the bed so loose that minerals of higher specific gravity can settle to the lower layer, while those of lower specific gravity rise to the upper layer. A continuous slow movement of the belt up the slope drags the heavy mineral to the upper end, while the wash and feed water running down the slope washes the light mineral to the lower or tailing end.

There are four classes of vanners, and their importance is reflected in the order described: 1) the side-shake, which vibrates at right angles to the direction in which the belt travels; 2) the endshake, which vibrates parallel with the direction in which the belt travels; 3) tipping, or undulating, motion at right angles to the direction in which the belt travels; and 4) gyrating in the plane of the belt. The Vanner was rarely used after the advent of oil flotation, a far more efficient process.

Vein - A fissure, fault or crack in a rock filled by minerals that have travelled upwards from some deep source.

Wall - The waste or country rock on each side of a vein. The upper or overlying wall of an inclined vein is the hanging wall while the underlying or lower wall is called the footwall.

Washoe Pan Process - A method of reducing silver ores utilizing a combination of both the California stamp mill and a refinement of the Cazo process.

Waste - The barren rock in a mine. It is also applied to the part of the ore deposit that is too low in grade to be of economic value at the time, but this material may be stored separately in the hope that it can be profitably treated later.

Waste Rock Dump - Waste rock that was mined and disposed in the vicinity of a mining operation, often at or near the entrance of an adit.

Whim - A machine for raising ores and refuse.

Widowmaker - A compressed air drill. The name refers to the high occurence of fatalities resulting from silicosis related to breathing silica dust produced by dry drilling.

Wilfley Table - An early form of jerking table designed by Arthur R. Wilfley in 1896.

Winze - A vertical or inclined opening sunk from a point inside a mine for the purpose of connecting with a lower level or for exploring the ground to a limited depth-below a level. A winze differs from a raise only in construction , the winze being driven downward and a raise being excavated upwards. When the connection is completed, the opening is referred to as a winze at its top and as a raise at its bottom.

Working Face - Any part of the mine where work is under way, such as the face of a drift or the face of a raise.

Appendix
D

NATIONAL REGISTER BULLETIN 42

GUIDELINES FOR IDENTIFYING, EVALUATING, AND REGISTERING HISTORIC MINING PROPERTIES

by
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PREFACE

Mining activity comprises an important component of our nation's heritage. Native Americans engaged in the extraction and processing of precious metals long before initial contact with Europeans. Stories of abundant mineral wealth ranked high on the list of factors that first attracted Europeans to the North American continent. The quest for mineral wealth continues in contemporary America. Many centuries of mining activity have left a legacy of historic mining sites that now exist throughout the entire United States.

The opulent Victorian architecture characteristic of some successful nineteenth-century mining towns has galvanized interest in preserving and restoring these communities. The decaying industrial sites where the actual mining occurred have received considerably less attention. However, the industrial mining sites often face the greatest threats today. Massive earth moving efforts associated with modem mining along with programs to reclaim abandoned mine lands, can harm the remnants of historic mining activity. In addition, many mining sites have fallen victim to the combined effects of neglect, abandonment, vandalism, and severe weather.

The threats faced by these properties, along with the complex task of understanding the significance of deteriorated sites associated with our industrial heritage, suggest the timeliness of a bulletin on evaluating and nominating historic mining properties to the National Register of Historic Places.

The National Register evaluation process offers a framework for assessing the significance of mining sites, while listing in the National Register will help assure that significant mining sites are recognized and protected when possible. The ultimate goal of this bulletin is to provide a body of information to support Federal, State, and local efforts to manage historic mining properties with a sense of stewardship predicated upon recognition of the importance of these properties in our nation's history.

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This publication has been prepared pursuant to the National Historic Preservation Act of 1966, as amended, which directs the Secretary of the Interior to develop and make available information concerning historic properties. National Register Bulletin 42 was developed under the general editorship of Carol D. Shull, Chief of Registration, National Register of Historic Places. Antoinette J. Lee, historian, is responsible for publications coordination and Patty Sackett Chrisman, historian, provides technical support. Comments on this publication may be directed to Chief of Registration, National Register of Historic Places, Interagency Resources Division, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127.

I. INTRODUCTION

The United States has ranked among the world's leading nations in the production of gold, silver, copper, iron, lead, coal, oil, zinc, molybdenum, uranium, and other metals. These treasures from the earth have also made major impacts on the settlement and development of many regions, from Appalachia to Alaska. Precious metals have created unimaginable fortunes, while unwise investment has caused the loss of millions of dollars. Large segments of the population have been influenced by the work of prying ore, rock, or coal from the bowels of the earth, The purpose of this bulletin is to assist in the recognition of significant mining properties worthy of listing in the National Register of Historic Places.

Some of this country's spectacularly successful mining operations have already been documented and recognized. For example, Virginia City, Nevada; the Sloss blast furnaces at Birmingham, Alabama, Butte, Montana; the Elkins coke works at Bretz, West Virginia; Kennecott, Alaska; and the Calumet and Hecla Mine in Calumet, Michigan, are designated National Historic Landmarks. Many additional mining properties are listed in the National Register of Historic Places. However, throughout the nation, many significant mining properties have yet to be documented, evaluated, and listed in the National Register. Many of these remaining resources are small, but important, elements of historic mining activity such as a ditch, a shaft opening, a road, or a collection of prospect pits. As a result, this bulletin will not focus on mining camps and their architecture, but instead will emphasize the identification, evaluation, and registration of the frequently overlooked mining properties and industrial tracts.

Mines and industrial tracts encompass a range of types of historical and cultural properties. They vary from iron works, to precious metal mills, to dredges and their associated outbuildings. They include mercury furnaces from the Mexican-era in the West, an early twentieth century nickel refinery in Perth Amboy, New Jersey; Russian coal mines in Alaska; the expansive pits of the Iron Range of Minnesota; coal tipples in Appalachia; and copper mines, of the Southwest. Although the various metals require different technologies to extract economically valuable metal from ore, there are many similarities in extraction, beneficiation (the initial process of upgrading ore), and refining. Oil and gas fields, however, require unique technologies developed for the extraction of fossil fuels. This difference means that the extractive industries of oil and gas are not examined in detail, although this bulletin will give general direction for their evaluation.

The transient nature of Mining activity has left a legacy of historic properties that pose challenges to our traditional rules for evaluating significance and integrity. Many mining structures were built for temporary use and quickly abandoned once the minerals had been exhausted. The resources have subsequently experienced decades of neglect, aggravated by vandalism and severe weather. In other cases, mining activities were short-lived. Hamilton, Nevada, for example, witnessed a whirlwind of silver rush activity in 1869, but the mines failed and the town faded to a ghost town within a

decade (Jackson, 1963). The significance of such properties will have to be based on their archeological potential and not on their present lack of standing structures.

The need for guidance in evaluating mining resources is pressing because of a marked increase in activities that threaten historic mining resources. These activities include the recent upswing in coal mining and precious metal mining which can impact historic mining areas. In addition, mine reclamation and clean-up efforts often threaten historically significant mines. Although well intended, these clean-up activities can contribute to the loss of significant resources.

The National Register of Historic Places provides an important tool for evaluating and protecting mining properties. Utilizing uniform criteria to evaluate significance and employing established integrity standards, the National Register process provides a valuable yardstick for measuring the historical significance of mining properties. Thus, the National Register is the best means for determining the significance of historic mining properties in the United States. In addition to providing an incentive for preservation by recognizing resources that warrant preservation, listing affords a measure of protection from Federal undertakings and can help to identify properties worthy of Historic Preservation Fund grant assistance, tax incentives, and other forms of assistance. The bulletin will also provide an approach for complying with Federal laws such as the Surface Mining Control and Reclamation Act of 1977 that help protect properties listed in the National Register.

National Register listing also gives credibility to State and local efforts to preserve mining resources based on their continuing contribution to a community's identity. The documentation contained in surveys and nominations of these historic mining properties - especially those that are neglected or threatened - is the key to their better protection and management. This information has a variety of uses, including public education; planning by local, State, or Federal agencies; or publication. The purpose of this bulletin is to guide Federal agencies, State historic preservation offices, Certified Local Governments, preservation professionals, and interested groups and individuals through the process of identifying evaluating, and registering historic mining properties to the National Register.

This bulletin outlines a general approach to the identification, evaluation, and registration of historic mining properties throughout the United States. A broad range of mining activities was conducted in different regions of the country. Although this bulletin may not provide specific details about every form of mining and every type of mining property, the general process discussed in this bulletin will assist with the nomination of a great diversity of mining properties.

The focus of this' bulletin is historic mines or associated properties constructed specifically for the extraction of minerals or to Support the extraction beneficiation, and refining of minerals.

In addition, this bulletin may also assist with the identification, evaluation, and registration of properties associated with non-metallic mining. Examples include clay mining (associated with brick making), salt mining, salt petre mining, and rock and gravel quarrying. For the purposes of this bulletin, the word "mineral," when used in the context of extracted matter includes coal. General instructions for preparing National Register nominations are available in two National Register bulletins: 16A: How to Complete the National Register Form, and 16B: How to Complete the National Register Multiple Property Documentation Form.

II. HISTORIC CONTEXTS FOR MINING

Mining camps have been the focus of many mining-related National Register nominations. Too often, however, mining areas are evaluated for their architectural resources without fully considering the role once played by industrial features like mines and mills. In many cases, the industrial features associated with mining receive scant attention because they lack any remaining buildings, structures, or objects. The transient nature of mining properties and the frequency with which mines have been abandoned means that many mining resources occur either as simple earthen protuberances or as subsurface voids. Historic machinery is scavenged from isolated mining locations, often to be displayed in distant museums. Present-day mining can obliterate historic mining features.

A single mining district may contain features dating to several distinct mining periods. The repeating boom and bust periods within a single mining district can complicate understanding the cultural resources in a former mining area. Each boom period occurred with the rise of metal market prices or by the introduction of new technologies. These booms brought new equipment and machinery, which is either superimposed over or placed alongside the remains of previous mining activity.

Along with changes caused by market price fluctuations or evolving technologies, the metals sought by nineteenth-century prospectors tended to change over time as local conditions improved, caused usually by a drop in transportation, labor, or fuel costs. Most Western prospectors initially sought gold, then moved to silver, and finally to base metals. For example, the Butte mines were first located during the great Montana gold rush of the 1860s. After the decline of the readily accessible placer gold, the local economy slumped until a fresh discovery made Butte a huge silver producer in the late 1870s. Silver mining collapsed in 1893, but by then the copper mines on Butte Hill had come into production (Malone, 1981). Other early Western mining towns witnessed similar, though less phenomenal, histories as silver mines became tungsten mines and gold mines began by yielding gold before later moving or to produce zinc and lead. The mining of iron, coal, and other base metals also relied on favorable economic conditions, all tied to cheap labor, fuel, and transportation.

The preceding discussion demonstrates that the initial evaluation of mining properties can pose challenges. These challenges result partly from the fact that the industrial features associated with mining have not always been fully appreciated. In addition, many of the industrial features, which typify mining properties, have either been demolished or seriously damaged through neglect. Finally, evolving technologies and changes in the types of minerals being mined can create situations where resources dating to a variety of periods may be contained within a single mining district.

The potential complexities of evaluating diverse and enigmatic mining properties can be addressed by identifying historic contexts. The identification of historic contexts should emphasize those contexts associated with extant historic properties likely to be

encountered during field surveys. By following this practice, historic contexts will help to unravel the separate threads of mining history, which may exist within a single geographic area.

A historic context can be described as a particular theme that is further delineated by a time period and a geographic area. (For example, "Silver Production in Butte, Montana, 1879-1893.") Identifying historic contexts will serve a variety of purposes. They can provide locational information that will assist with the identification of mining properties in the field. Furthermore, an individual property associated with a given historic context can be compared with other properties related to that context to reach decisions about the relative significance of related properties. In addition, initial historic context documentation identified at this early point will expedite the nomination process by allowing for eventual incorporation of this documentation into the narrative of a nomination.

With regard to historic contexts for mining areas, the theme component of the context will revolve around some aspect of mining history. These themes should not be defined too narrowly. In addition to considering mining technology, research done to develop themes should consider transportation, water systems, habitation, labor, the role of ethnic groups, and the role-played by prominent figures in the mining industry. In some cases, themes may involve mining as one component of a more general overview of a community's industrial and economic development.

In defining an appropriate time frame, a historic context (or series of contexts) should attempt to span the period from the time of a mining region's initial discovery to the point of its abandonment or decline. Although each mining district will have its own unique history, districts will experience a series of similar phases during the course of their development. Generally speaking each district will have: 1) a discovery phase, 2) a development or boom phase, 3) a mature phase or phases emphasizing production, and then 4) a bust or decline phase. These phases may recur if a new technology is discovered to work the lower-grade ore or if other developments occur, such as the advent of uses for discarded ores or the new availability of cheaper transportation, fuel, or labor. Awareness of these common phases may help to determine the appropriate time periods for mining district historic contexts.

The geographic component of a historic context can relate to political boundaries, which define the extent of a town, county, State, or Federal land management unit (i.e., a national park or national forest). The geographic definition may simply be the mining district boundaries established during a miner's meeting and duly recorded in the county courthouse. The US Geological Survey (USGS) has also drawn boundaries for mining districts that may clearly define the geographic extent of historic mining activity. In addition, for over a century USGS has published bulletins, which include maps of mining regions. In the East, State geological survey reports and maps serve the same purpose. These maps may also assist with the development of historic contexts.

In conclusion, historic contexts must be identified to allow for confident evaluations of a historic mining property's significance. Because most mining properties are either in ruins or mere imprints on the landscape, they can pose difficult integrity questions.

Significance must be determined based on an understanding of an area's history before making decisions about National Register eligibility. In some cases, significant historic properties may be entirely overlooked without a proper historic context. Even ruinous properties can be significant if they yield information valuable in historical archeology, especially if the property contains remains of engineering works that help to illustrate the broader historic context of technological innovation and diffusion. For example, the nomination of the Dubuque, Iowa, lead mines was based on a written historic context and on archeological evidence that revealed a great deal about mining and smelting technology in the early 1800s. The nomination of these lead mines occurred in spite of the fact that no standing structures remained at the location of this previously active mining district.

SOURCES OF HISTORIC CONTEXT INFORMATION

Identifying historic contexts related to mining activity should begin with an investigation of existing contexts. State Historic Preservation Officers (SHPO) represent one possible source of existing historic context documentation. In particular, statewide historic preservation plans, previously completed multiple property submissions, and other information maintained by SHPO may contain material concerning historic mining properties. Other possible sources of existing information include Federal agencies (particularly Federal land-managing agencies) and academic institutions. Background investigations may reveal that a number of mining related historic contexts have already been developed for a given area. If so, these existing contexts may provide valuable assistance to the researcher.

A number of other sources may assist with the development of historic contexts. The USGS has published mining-district maps showing geologic formations and minerals throughout the United States. In addition, descriptions of mining districts are contained in a series of USGS bulletins, monographs, professional papers, and other publications. These sources supply information on ore deposits. Some mining districts, especially in the West and Alaska, received thorough evaluation and mapping by the USGS. These evaluations led to the publication of reports that describe mines, prospects, and company activities, as well as geographic and cultural information.

In the East and the Midwest, where the USGS was less active, State geological bureaus provided similar publications and maps on mining regions. Coal mining areas in Pennsylvania, West Virginia, and Kentucky, for example, were extensively mapped by the State. Early information on lead mining can be found in the reports of the State geological offices of Missouri, Wisconsin, and Iowa. Information on the early copper industry can be found in Michigan geological reports.

Information in these geological reports, which often included economic histories, can be crosschecked with corporate descriptions in the Mines Handbook (after 1905) and The Mineral Industry (after 1892). Other useful government reports include the annual reports of the U.S. Mining Commissioner, 1866-1876, the reports of the Director of the Mint, and the Bureau of Mines annual report (later called the Minerals Yearbook). These reports, particularly the bulletins and information circulars of the USGS and Bureau of Mines, frequently include specific data on lode and placer mining techniques and equipment as well as discussions of individual mines and mining districts. The Bureau of Mines also published technical reports on mine safety and technology.

Other records of the Federal government will have potential research value. With regard to mining in the West, specific information about mine ownership can be found in the mineral patent records of the Bureau of Land Management (BLM). Created through a merger of the Grazing Service and the General Land Office in 1946, BLM offices will also contain records of mineral patents issued by the General Land Office. Deed records housed in the local county courthouse may provide an additional source of mine ownership information. If litigation occurred, extensive files may found in the Department of justice records in the National Archives in Washington, DC. If minerals were produced for military purposes, the records of the Secretary of War should be consulted.

State and local histories may contain information on mines and mining in a particular locality. In addition, some States published annual reports issued by State geological surveys, mine inspectors, mining commissioners, or department of mines. Records of State Corporation commissions, which may contain articles of incorporation and annual reports, can help to explain corporate involvement in mining enterprises.

Period journals and newspapers provide a panoply of promotional information about a mine. Both successful and unsuccessful mining camps and towns frequently had newspapers that touted each mine or prospect. Individual mines and mining companies produced annual reports and distributed other forms of literature. The productive ones published annual reports, which might include photographs, and diagrams that typically described the extent of both works and machinery. Although mining town newspapers and company literature can provide fascinating local color, these sources must be used with caution based on their inclination to accentuate the positive and downplay the negative.

In some cases, mining activity was well documented by early photographers. Archives, museums, and other sources should be contacted for historical photographs to assist with historic context research. Photographs of mine equipment and mill machinery for a specific mine may not exist, but contemporary photographs of nearby mines and mills document the material culture and industrial facilities of a particular mining region.

In the West, early mining district record books can serve as an important source of historic context material. In some cases, these record books document the formation of

miners' committees that established district laws and recorded the tenuous ownership of mineral deposits. (After the passage of the 1872 Mining Law, only a patent issued by the Federal government would legally secure ownership.) A hypothetical example of the value of these early records might involve a prospect pit discovered in an 1860s gold district, but abandoned after the first rush. Lacking these records to provide historic context information that links the property with the early gold rush era, the evaluation may be based solely on the marginal integrity that the property exhibits today. Such an evaluation would overlook the prospect pit's critical association with a significant period in mining history.

Oral histories can also serve as an important source of historic context information. Individuals living near historic mining areas may offer valuable information about resources in a given locale. In some cases, previous oral history studies will already have documented these stories either on tape or in print. In other cases, researchers may have to seek out individuals capable of providing valuable perspectives concerning local mining properties.

There are many books and other sources of information on the history of mining. (See Section VI for a listing of mining history references.) These studies help provide a general understanding of mining history. The difficult task is to combine the historic context information in these sources with the guidance provided in other National Register publications and use these materials to conduct successful field evaluations and prepare nominations for actual mining properties.

III. IDENTIFICATION

SURVEY AND DOCUMENTATION

National Register Bulletin 24: *Guidelines For Local Surveys: A Basis for Preservation Planning*, provides advice regarding appropriate fieldwork practices. Although National Register Bulletin 24 addresses questions about where and how to survey, specific questions about mining-related resources are not defined. Therefore, the following comments offer guidance specifically focused on surveying historic mining properties.

Perhaps most importantly, surveys of historic mining areas should be conducted with caution. Because mining properties are often located in remote areas, such as rugged mountain slopes or in steeply banked canyons, hiking trails may provide the only access. Given this situation, those involved with mining area surveys should be prepared to encounter rigorous conditions when conducting fieldwork.

Mines present special hazards with potentially lethal consequences. Field personnel should be trained in, familiar with, and able to recognize mining related dangers prior to conducting fieldwork. All explosives encountered should be considered extremely dangerous. Blasting caps are just as dangerous as "stick" powder. Explosives can be found in any part of a mining area, not just in the vicinity of the powder magazine. The ground around mine openings is frequently unstable; unguarded and obscured shafts, raises, and stope openings are hazards to avoid. Covered mine openings should not be considered safe. Unless proper training has been completed, one should not enter the underground portion of a mine. The hazards associated with surveying historic mines are real and should not be ignored.

In the West, many historic mines are located on public lands. The opposite situation prevails in the East where most historic mines will be on privately owned lands. Regardless of the geographic locale, owner consent should always be obtained before venturing onto privately-owned mine lands.

After ascertaining that conditions are safe and contacting the Owners, begin the survey by defining the limits of the area to be investigated. This could be the entire mining, district or just one mining claim whose boundaries are recorded in the mining deed records in the county courthouse or in the mineral patent records of BLM. If a mine operation extended over several claims, patented or un-patented, the survey area should encompass the full extent of claims associated with the mine. In the case of large mining corporations, Ownership could extend over hundreds of claims. Other sources that will assist in defining the limits of a survey area include oral histories, company records, industrial directories, and USGS and State geologic maps and surveys.

The relationship between the claim and the topography can differ dramatically between hard rock and placer mining districts. Placer claims will usually be oriented to the

drainage patterns while lode claims will follow the geologic structure as it was understood at the time the claims were located. Claims may also overlap and homestead, townsite, and other land claims may cover the same ground as placer and lode mineral claims. Knowledge of the historic development of an area should be acquired before conducting fieldwork. This will ensure appropriate boundaries for the field survey. Because many mining properties contain few standing buildings or structures and disconnected parts of machinery scattered throughout the area, the field surveyor should use the previously gathered historic context information to determine the type of mine at hand. This step is important because, for example, a placer mine will have different features than a hard rock mine or mill. Hard rock mines tend to have more fixed structures than placer mines. More important, placer mine surface equipment does not necessarily stay in one place. Overtime, placer mine excavation and processing plants are moved along a creek as the stream bed is dug up and the auriferous material washed through the sluice box. On some creeks, the equipment associated with a placer mine may be found abandoned in place miles from where it was first used.

Furthermore, the fieldwork should result in thorough mapping of any evidence of earth-moving activity. This would include the mapping of waste rock and tailings piles. Dumps and tailing piles will often indicate the locations of removed or obscured features and will provide clues about the type of activity that created them. Coal mine waste gobpiles on the Illinois prairie or placer mine dredge tailings in California may be the only indications that major mining industries once operated in these areas. Outlying support features should be mapped as well. For example, if a headframe stands over a shaft not only should the headframe be described, but also the hoist house. The dams, flumes, and penstock supplying water to placer mines are as important as the camps erected to house the miners. Machinery should be described, especially its function and manufacturer (if these can be readily determined). Sanborn fire insurance maps and patent maps from BLM may provide descriptions and details on mines and structures that date to the time when the mine was in operation, as would any map prepared by companies owning the property. If available, these maps should be compared to the resources evident today.

Mill drawings may be available from company records. If not, examples of mills are in standard plan books, mine machinery catalogs, contemporary mine engineering books, or advertisements in such journals as Cod Age, Mining and Scientific Press, The Colliery Engineer and Engineering and Mining Journal. Regional journals are also helpful, but are rare until the 1890s. Field analysis of mills, especially outlines of foundations and tailings, will help describe the adaptations of general plans for the specific location.

A process flow chart is essential in understanding the metallurgy in use at mills. Flowcharts were prepared for all mills, but few are extant Thus, thorough mapping and noting of machinery in place is needed in order to reconstruct the flow chart diagram. Similarly, mapping of landscape features and remaining equipment can be used to

reconstruct operations at placer, hard rock, and coal mines. While usually, less complex, flow charts at coal and placer mines are equally useful to the understanding of mining operations.

Mining property surveys should include preliminary research related to the mine, the actual field survey of physical remains, and property analysis designed to reanimate the operational system, which once functioned at a mine. This three-step process is especially important in cases where the contemporary mining property lacks historic buildings and structures.

PRELIMINARY RESEARCH

As discussed previously, preliminary research is begun during the initial process of preparing historic contexts. However, in most cases, new information will be produced to refine historic contexts both immediately before and during the field survey. Thus, the ongoing nature of preliminary research will help to flesh out the historic contexts, develop new contexts, and provide further input to the field survey process. In turn, information derived from the survey will lead to further refinements in the historic contexts.

When conducting preliminary research, it is critical to engage in a literature search that yields information about the type of extraction, beneficiation, or refining process that took place in a given area. Preliminary research into the history of resources associated with mining activity plays an important role in preventing erroneous field interpretations: bituminous coal is processed differently than anthracite; a gold mill is different than a silver mill. At minimum, read the USGS or State geological bureau report on the mining area prior to beginning the fieldwork. Remember too that technology changed, as did the terms used to describe mining. Use technical publications contemporaneous with the period of mine operation: a 1930s technical description of a gold mill will differ greatly from a description in an 1880s publication.

Other sources to consult include the following: census records, tax assessment records, company books, personal diaries, community plats, cartographic sources, iconographic and pictorial materials, professional and technical journals, governmental publications, newspaper accounts, city directories, oral histories, and local informants. Information recorded during fieldwork should use mining nomenclature from the period of operation and for the region. A West Virginia coal tipple and a Nevada mine headframe and ore bin might do essentially the same thing store coal or ore pulled from the mine - but mining glossaries will help field crews get their descriptions correct Use the appropriate glossaries and technical publications for the area and era. (See Section VII for a partial glossary of mining terms.) Initial historic contexts developed at this point should remain flexible enough to allow for the incorporation of new materials that may result from visiting the property or completing additional research.

FIELD SURVEY

With the preliminary research documentation in hand, the field inventory of physical remains can begin. The physical remains of mines may include standing buildings, structures, and other architectural remains; machinery; archeological remains; and landscape features such as mine waste rock dumps, mill tailings, water delivery systems, open pits, and roads Archeological remains, which may be the most abundant, typically include prospects, privy pits, wells, cellar holes, building foundations and platforms, dugouts, domestic and industrial trash dumps, isolated artifacts, collapsed headframes, machine pads and platforms, depressions, roads, ditches, pathways, and bulldozer cuts.

The methods used to locate the physical remains of mines may include aerial photography, pedestrian survey, remote sensing (such as radar profiling or proton magnetometry), and simple probes. For preliminary mapping and assessment purposes, low-level aerial photography is an excellent way to document the physical remains of mining properties. A systematic program of pedestrian survey, however, is essential. Planning for scale is critical since the physical remains of mining properties may cover a large geographical area. Historic placers, which can extend for miles, call for inventive approaches to field mapping and documentation. For example, using small-scale aerial photography and transparent overlays to record linear features and apparently isolated elements as well as the location of larger concentrations of features can often make sense out of apparent chaos. Superimposed historic maps on contemporary maps can help identify features and further detail the chronological and industrial development of an area. Recording methods should include photography, the preparation of architectural plans and elevations, sketches of machinery and other objects, narrative description, and the preparation of scaled maps.

Field surveys also should include methods for assessing the integrity and significance of the physical remains. Determining whether archeological deposits have a buried component may, for example, require probing or remote sensing. The suitability of the physical remains for conveying a sense of time, place, and historical patterns or themes should be considered. The surveyor should also record observations about the extent to which the physical remains are repositories of information, including the presence or absence of artifacts that carry information needed to answer important research questions about mining technology or community. Mining resource surveys will often require multi-disciplinary approaches to survey, using the talents of archeologists, historians of technology, landscape architects, architects, and mining engineers as well as assistance from geologists or practicing miners or individuals with first hand knowledge of the area.

PROPERTY ANALYSIS

Beyond field identification of individual physical remains, the greatest challenge connected with mining property Inventories involves the issue of property analysis. In

this case, property analysis refers to the need to link the now disparate physical remains to the former reality of working mines and related social systems. What now appears to be disconnected and geographically isolated buildings, landforms, machinery, and archeological features once worked together to accomplish ore extraction or beneficiation.

Identifying the activities and the time periods represented by the physical remains is a key problem. Abandoned mining properties, for example, typically are reoccupied and may include buildings, machinery, landforms, and archeological remains from more than one time period. The new episodes of mining cut through the physical remains of older mining activities, makings it difficult to interpret the engineering and other technological systems from earlier time periods. Sorting the physical remains by time period and activity into separate technological or social systems may be helpful. The location of the Tenabo Mill in central Nevada, for example, which was built in 1886 to process gold and silver ore, includes the mostly archeological remains of two separate beneficiation technologies: the Russell process in the original mill and the cyanide process installed in 1908. Evidence of both technological systems can be seen when viewing the extant physical remains today, but the earlier Russell process technology has been largely destroyed by the later cyanide operation (Hardesty, 1988).

IDENTIFYING PROPERTY TYPES

Mining properties may contain a great variety of resources representing the mineral-extraction process. Evaluation of these complex properties can be organized by noting that the processing of ore into metal includes the following three basic functions: extraction of the ore from the earth; beneficiation, which upgrades the ore's value; and refining which enhances the value of the ore/ metal even further until it achieves a nearly pure state.

All three functions may occur within one mining property, such as at some Western or southern Appalachian gold mines, or may be miles apart, such as iron, copper, or lead smelters located great distances from mines. Although a universal description of mineral properties will not address all individual cases, the following provides a general guide to defining historic mining property types based on these three fundamental stages of mineral processing:

EXTRACTION

The property types associated with mine extraction sites can be generally classified into two categories reflecting the evolution of a mine: prospecting/ mine exploration property types and mine development or exploitation property types. The distinction can be applied to hard rock, placer, and coal mines. Prospecting/Mine Exploration Property Types These property types are associated with the search for ore bodies. Hand-dug prospect pits, power-shovel trenches, bulldozer cuts, and drill holes, for example, are the physical remains associated with four different patterns of mine

exploration technology. Some additional explanation will help to understand the origin of typical exploration activity.

Mining is a speculative industry. To discover metal, many test pits or prospects must be dug. According to the 1872 Mining Law, holding an unpatented Claim requires a miner to do annual assessment work that might include digging another prospect hole in order to retain possessors title by demonstrating that a claim is still active. If a mining district has a producing mine, speculators employ a process sometimes known as grubstaking that involves paying prospectors to seek outcrops of ore and to excavate exploratory shafts or adits. In return, the prospector promises the speculator a percentage of any profits earned. In big speculative ventures in coal, iron, or copper areas, investors might pay crews to test lands they have optioned for purchase. In placer mines, pits as well as trenches may be found across streambeds or on benches where placer miners sought gold at bedrock, often without luck.

Given this sort of activity, holes abound in mining areas. These holes are not truly mines, but prospects. Individually, these prospects may appear to lack significance. However, prospects are often associated with the phase of a region's mining history that witnessed rampant speculation or boom and bust. Entire mining camps have arisen based not on actual metal production, but on the speculative investment in prospects. Thus, isolated holes - shafts or adits may qualify as separate property types. In addition, a combination of research and field work may reveal a pattern of prospect holes on the land that offers physical evidence of the speculative phase of mining development in a given region.

These prospect holes may acquire additional significance if historical archeological evidence associated with an adjacent camp or equipment is found. If the material culture possesses sufficient integrity, it will help the archeologist in reconstructing the unwritten history of the mining property. Additionally, the prospect hole may have significance if it is associated with any of the following: the first settler of an area, a prominent miner with whom no other properties are associated, or to prehistoric or aboriginal mining.

Mine Development and Exploitation Property Types

These property types are associated with the definition and extraction of an ore body. Typically found at such locations are the physical remains of hoisting works such as headframes and hoist engines, excavations such as open pits or shafts or adits; ventilation systems such as air shafts or blowers; power systems such as steam boilers or electric generator houses, drainage systems such as Cornish pumps; water delivery systems; ore bins or tipples; transportation systems such as short line railroads or ore cart runways, and maintenance and administrative facilities such as blacksmith shops, assay laboratories, offices, and worker's housing. These structures and systems are described in the nine-volume Mining library published by McGraw-Hill in the 1910s. Their eight-volume Library on Coal Mining series does the same for that industry.

Hard rock mines were opened with shafts or adits (tunnels). The ore was removed from large openings called stopes. Creation of these large openings required the use of new support technologies such as square-set timbering and, later, concrete supports. A hoist and head frame over a shaft used a cable and bucket or cage to hoist ore; a horizontal adit had a level or slightly inclined rail system to tap the vein. An open pit or surface pit used earthmoving machinery to remove overburden and to extract ore. At the mine Beneficiation, in its strictest definition, includes every phase of upgrading mineral value, from the mine face to the refinery product However, in its common use, the meaning of beneficiation is restricted to the processing of ore in a mill or concentrator, or otherwise preparing the ore for refining. In the Iron Range of Minnesota, concentrators were called "beneficiation plants". Surface, waste rock was dumped and ore was stored in bins to await shipment to processing plants.

Coal mines were different from hard rock mines in that coal was usually ready for market after minimally separating it from waste rock by water or gravity (or both) and dumping it into bins for shipment. This all occurred in a tipple, located at or near the mine entrance. The development of the district around St. Clair, Pennsylvania, was characteristic of the anthracite regions of Appalachia in the nineteenth century. At the mine, coal was extracted by pit, shaft, or other standard methods, and then broken, cleaned, and sized at a surface plant called a breaker (used to crush the hard anthracite coal). Mine owners then loaded coal into railroad cars bound for the markets of Philadelphia or nearby industries (Wallace, 1988). There was no further beneficiation. or refining. Some bituminous coal was converted to coke by a baking process in beehive shaped ovens, which removed impurities. Coke ovens were beneficiation plants, in the strictest sense, used to improve coal to meet the heat requirements of industry.

Placer gold mines, abundant in the West, required a different technology than either hard rock or coal mines. For example, a placer gold mine system might include dams, penstocks, flumes, ditches and holding ponds for water, moved gravel and rock piles; sluice boxes or long toms; hydraulic nozzles; camp buildings, support structures; and, if used, dredges and their support facilities. Placer mines can extend for miles along a streambed.

As technology changed, placer mining operations might also cover earlier operations, new tailing piles covering old workings. In the placer mines of Virginia City, Montana, gold miners in the 1860s first used simple sluice boxes and then hydraulic plants to extract gold nuggets and dust. After 1890, the Conrey Placer Mining Company used floating gold dredges on Alder Gulch to dredge gravel and wash the gold dust and nuggets from the waste, while also covering earlier mine debris. The gold was purified and melted into bars at an assay lab on site and shipped to the US Assay Office in Helena. There was no further processing needed to sell the mine product to the purchaser, the Federal government (Spence, 1989).

The technical literature on placer mining is vast; see, for example, August J. Bowie, *Hydraulic Mining*, 1878; Robert Peele, *Mines Handbook*, 1918 ed.; Charles Janin, *Gold Dredging in the United States*, 1918; and the bibliography in Rodman Paul, *California Gold*.

BENEFICIATION

Except for coal, placer gold, or the rare cases involving placer silver, platinum, or copper, most minerals are extracted from the ground in an impure and excessively bulky state and need to be upgraded before shipment to a refinery. Beneficiation-the upgrading of ore to increase its value-is accomplished in a processing plant. Beneficiation is a broad category, which includes many metallurgical Processes.

The history of metallurgy is complex and rapid changes occurred during the nineteenth and twentieth centuries. Thus, one must be aware of changing processes used for metal beneficiation as well as the machinery developed to crush, concentrate, and separate metal from waste rock Fortunately, the various processes used in connection with beneficiation property types are detailed in published textbooks. For example, Charles R. Hayward's *An Outline of Metallurgical Practice* (1929, revised 1940) describes over fifty different processes for extracting metals.

The complexity of beneficiation property types results, in part, from the way that the technology of milling systems responded to the increasing sophistication of mining, practices. At the Oro Belle mine in the Bradshaw Mountains of central Arizona, to cite an example involving gold, the first prospectors of the 1860s used the donkey-powered arrastras to crush the ore and then used mercury to amalgamate the gold. In the early 1870s, a group of miners built a steam-powered arrastra. In 1888, the new owners built a standard ten-stamp mill to crush the ore. The sand-like ore then washed across copper plates where mercury captured or amalgamated with the gold. This mill was eventually expanded to include concentration tables, which produced a concentrate of lead, zinc, and gold, which was shipped to Colorado smelters. By the early 1890s, the cyanide process was introduced at the plant. This evolution was typical. Thus, a property might have an overlay of several technologies. Similar changes concentrators and copper concentrators during the nineteenth and twentieth century.

In general, the development of concentration mills changed through time to reduce the amount of skilled labor required for each ton of ore processed. In the book *Cradle to Grave*, Larry Lankton discusses the evolution of technology and its impact on Lake Superior copper mining labor and strife. It is important to link the evolution of mining technology to the impact it had on management, labor, business, politics, and communities, besides the obvious role it had in the history of science and technology.

Iron, copper, lead, zinc, and other base metal ores commonly were crushed and received initial beneficiation in concentrators that were first based upon gravity and then upon flotation processes. Understanding which process was used will help the field team determine what type of crushers and/or separation machines were used.

This will also help with architectural description since mills were designed around the interior machinery metallurgy not the reverse.

Smelters represent another type of beneficiation plant. A smelter may accept high-grade ore directly from a mine or receive the concentrate from a mill for further reduction by heat. The heat and fluxes of the smelting process removed further impurities and upgraded the ore into a form known as a matte. Early smelters were small scale and operated either adjacent to, or in proximity to, the actual mines. As transportation networks evolved and fuel, space, water, labor and other factors came into play, smelters were relocated away from mines. The early plants used simple log-, charcoal-, or coal-fueled fires to melt ores into a matte that was still not pure, but rich enough in content to ship to refineries and manufacturers.

Given the evolution of the smelting process, an early nineteenth- century Pennsylvania iron "plantation," a mid-century Midwest lead smelter, and an 1860s -1880s Colorado silver-lead smelter would all be located near the mines. By the end of the century, new economics of scale and fuel demands were removing the plants from the mines to distant locales. In the process, the industry became identified with the large conglomerates created at the turn of the century such as Anaconda in copper, the American Smelting and Refining Company (ASARCO) in silver-lead (Marcosson, 1949; Marcosson, 1957), and U.S. Steel. Smelters either operated as independent corporations that bought ores from a number of producers or as part of an integrated system linking mine, mill, and smelter. Large smelters were built at rail centers and near fuel at Pittsburgh; Pueblo, Colorado; El Paso; and the Salt Lake Valley-to serve many mining districts.

Certain smelting companies, like the Cambria Iron Co. at Johnstown, Pennsylvania, and the United Verde Copper Company at Jerome, Arizona, provide examples of the evolution in the direction of high-capacity smelters. Each mining company began with small furnaces with a capacity of a few tons per day; within three decades of initial operations, the firms had mammoth plants reducing thousands of tons of iron or copper ore. Cambria included coking ovens to prepare coal, iron furnaces, roller mills that produced railroad rails and iron wire all in a one mile long complex (Brown, 1989).

The above discussion reflects the complex nature of beneficiation as the process evolved over time. The broad overview provided is intended as a general introduction to the subject that will assist with the identification of property types associated with beneficiation.

REFINING

Refineries convert metal into a state of purity suitable for industrial use, manufacturing, or for commercial exchange. US mints, and US assay offices refined the gold and silver amalgamated from mills. Although private banks, express offices, and assay offices might also contain the necessary furnaces to refine the metal, after 1866 Congress

required them to sell their product to the US mints. (Prior to 1866, several private assay offices minted gold coins for regional use as specie.) By the turn of the century, a dozen branch mints or assay offices were operated by the Bureau of the Mint. These offices served the local mines by buying gold and helped the local economy by providing gold coins for the specie-short frontier economy, from the southern Appalachian gold fields to Alaska.

Base metals used by industry were refined at the larger smelters of the West or in eastern refineries that offered access to international metal markets. Refineries were like smelters and operated in concert with them. The Eureka, Nevada, refinery' one of the earliest in the West, is discernable from the adjacent smelter by location and by archeological evidence. Refineries might also be associated with manufacturing works in eastern cities, where the refinery might also be used to create blended metals called alloys. The great works of the New York City area and Chicago provided an array of metals and alloys to manufacturers. In general, field survey will be easier for refinery property types because of the amount of technical literature published about these large-scale, capital-intensive properties.

In addition to defining property types based on the three mineral processing stages, other historic mining property types exist. These property types include engineer-designed complexes, mining landscapes, and related properties.

ENGINEER-DESIGNED COMPLEXES

The ideal mining situation was the bonanza mine that had its own concentration mill on site; a smelter to reduce the product into nearly pure metal; a tramway or railroad haulage system connecting the entire works; and an infrastructure of power house and lines, company housing, store, and office. This situation most often existed in iron and copper camps. For example, by the end of the 1890s the Arizona Copper Company had an integrated complex designed by mining engineers. This complex included shaft houses with hoists that lifted the ore to ore bins, narrow gauge trains that collected and hauled the ore to concentration mills, and railroads that hauled the ore from the concentration mills to the company's smelter at Clifton, Arizona.

Most larger mines were part of an engineer-designed system. They were intricate industrial operations with every component ideally working in harmony to reduce costs, increase production, and maximize profits. Especially after the 1890s, mining engineers developed standard systems for mine operation. *The Mines Handbook* by Peele et al. describes in detail most of the components of the mine engineers' system. This system, which integrated massive operations to produce economies of scale, corresponded with the rise of big business in America. Massive operations created phenomenal profits, which often went into bigger plants. These engineer-designed complexes help define the twentieth-century operations at Minnesota's iron ranges, the copper mines of the Far West, the lead and zinc of the tri-state region of the Mississippi

Valley (Illinois, Wisconsin, and Iowa), and the big gold mines of Cripple Creek, Colorado, and the Homestake of Lead, South Dakota.

On the other hand, smaller mine operations may have been designed by a skilled craftsman during the nineteenth century or before, or by an engineer, especially after the turn of the century. Yet, these are rarities. The lead district in the tri-state region of the upper Mississippi Valley, for example, is dotted with small mine pits where miners extracted abundant lead deposits during the antebellum period. These pits reflect a lack of system in mining as well as a lack of common knowledge about geology, ore deposits, and mining. Engineer-designed complexes reflect the development in the professional skills of mine engineering and allowed for the development of massive industrial corporations.

MINING LANDSCAPES

National Register Bulletin 30, *Guidelines for Evaluating and Documenting Rural Historic Landscapes* defines a rural historic landscape as "a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. Given the extent to which mining activity represents a human activity that modifies the natural features of the earth, many mining properties will qualify as historic landscapes.

Landscapes may represent the most dramatic visual images of mining. Mining landscapes evoke images of time, place, and historical patterns associated with past mining epochs. Mining landscapes might Include ravaged landscapes denuded by nineteenth-century hydraulic mining in the Mother Lode region of California, barren strip-mining landscapes of West Virginia, gaping holes in the earth characteristic of open-pit mining landscapes found in places such as Bingham Canyon in Utah and the Mesabi Range in Minnesota, and dredging landscapes in Alaska characterized by mounded tailings piles lining great stretches of creek and river beds. In addition to the visual impact of the mining landscape, the landforms created by mining provide clues to past activity. Spoil piles often indicate the location of adits and shafts, and placer tailings can help define the methods used to mine a stream even if few artifacts are present.

Mining landscapes can be characterized and distinguished by historic patterns of land use such as strip-mining, hydraulic mining, or open-pit mining; the spatial organization or layout of the landscape, characteristic natural and cultural landforms such as mine waste rock dumps, mill tailing flows, and canyons; roads and pathways; vegetation patterns related to land use such as secondary growth of plants on mine waste rock dumps; distinctive buildings and structures such as headframes or cyanide mills or coal tipples; clusters of buildings and structures such as those at mines or urban settlements; and small-scale features such as mine claim markers or fences. Landscapes can be

described and evaluated by utilizing the methodology applied to rural historic landscapes (see National Register Bulletin 30.) In most cases, mining landscapes will be defined as historic districts for the purposes of National Register nomination.

RELATED PROPERTY TYPES

Mining properties may include buildings, structures, or systems that support mine operations such as entire communities complete with stores, schools, and other properties. For example, housing and support facilities such as employee homes, machine shops/blacksmith shops, and power houses may be located on mining property. Rail haulage and road systems may also appear. McGill, Nevada; Madrid, New Mexico; and Calumet, Michigan are examples of one-time major mining towns that include housing and support facilities, along with the usual commercial and service industries. These related property types should be recorded as components of the overall mining operation.

In remote placer districts, such as in parts of Alaska, isolated mining camps -tent frames and small cabins - that once provided shelter frequently remain as monuments to the tenacity of early prospectors and miners. Water pipelines and ditches (like the Fairhaven Ditch across Bering Land Bridge National Preserve) snake around the contours of hills for miles, often far from any other evidence of mining activity. Small mining camps may contain a limited number of buildings and structures: one or two cabins or tent frames and a few outbuildings such as a shed, several doghouses, and a cache. These small camps, while important as mining property types, are often associated with a number of other activities including hunting trapping, and woodcutting.

Potentially significant mining-related properties can also be located in places distant from the actual mine locations. These properties include mine union halls, hydroelectric plants, school of mines laboratories, courthouses, and mine promoters' homes. Although important to the history of mining, these properties require little discussion in this bulletin. They can be evaluated and nominated according to standard practices outlined in National Register Bulletins 16A and 16B.

IV. EVALUATION

APPLYING NATIONAL REGISTER CRITERIA TO MININING PROPERTIES

To be eligible for listing in the National Register of Historic Places, a mining property must be significant in American history, architecture, engineering, or culture and possess integrity of location, design, materials, workmanship, feeling, and association. In addition, the mining property must meet one or more of the four National Register criteria:

A. be associated with events that have made a significant contribution to the broad patterns of our history; or
B. be associated with the lives of persons significant in our past; or
C. embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that posses high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. have yielded, or may be likely to yield, information important in prehistory or history.

CRITERION A

Under Criterion A (association with "events that have made a significant contribution to the broad patterns of history") a mining property may qualify for listing in the National Register through its connection with historic themes. Applicable areas of significance (listed in National Register Bulletin 16A) include the following: Agriculture: Some early mining properties were operated as part of plantations or haciendas which included the production of foodstuffs for workers and wood for furnaces.

Hopewell Furnace National Historic Site, a restored iron plantation in Pennsylvania, exemplifies this type of early mining operation, as do presently unevaluated Mexican-era mines of the Southwest around Tubac, Arizona.

Business: The development of big business has been associated with extractive industries generally, and oil and the iron and steel industries specifically. The captain of industry or robber baron, depending on the view of the writer, is exemplified by such families as the Rockefellers, the Douglases of Arizona, and the Guggenheims.

Commerce: Mining properties such as the Julien Dubuque lead mines of Iowa produced minerals for exchange and barter. Other commerce--related mining activities may include those properties associated with attempts to corner certain metals markets, such as Jay Goulds' effort to corner gold in the 1860s and the Secretan syndicates attempt on copper in the 1880s. Virtually all-successful mines helped to increase commerce and trade.

Community Planning and Development: Company towns often were found adjacent to mines, especially in the base metal and coal industries. Some town planning was unique such as Phelps-Dodge's mission-style company towns at Ajo, Arizona, and at Tyrone, New Mexico.

Conservation: Mining has often been viewed as the anti thesis of conservation. Major disputes over resource conservation have been caused by the attempts of corporations to exploit ore bodies. An example would include the Ballinger-Pinchot feud which involved efforts to develop an Alaskan coal field intended to provide fuel for a proposed smelter for working Kennecott copper ores. This plan violated the conservation philosophy espoused by US Forest Service Chief Gifford Pinchot and led to a controversy that eventually caused serious fractures both in President William H. Taft's cabinet and in the Republican party.

Economics: The accumulation of phenomenal wealth from a few mines caused massive speculation in the industry as well as in the stock markets of the world. The brief economic panic of 1907, for example, is associated with the financial machinations of Butte's copper kings and the collapse of rampant speculation in the mines of Nevada. The history of monetary processes is closely tied to the precious metal industry. The Panic of 1893 was, caused by the demonetization of silver; its impact was the near total collapse of the Western silver mining industry.

Education: Schools of mines played a significant part in the development of public education, especially in the West where training was needed to operate mines and mills. These colleges often had laboratories or educational mines in mining districts. A number were located in mining districts, such as at Fairbanks, Alaska; Houghton, Michigan; and Butte, Montana. In certain instances, Schools even owned and operated mines. Examples include Harvard University's ownership of the Conrey Placer Company of Montana.

Engineering: After 1890, many mining complexes featured components designed by mining engineers. This would include water and transportation systems built to serve mining operations. Noteworthy examples of mining engineering would fall under this area of significance. The ascendance of the mining engineer over the skilled craftsperson was a gradual process. Many mining properties can demonstrate the nature of the change and provide evidence of the intermediate steps in the process of change.

Ethnic Heritage: Alibates Flint Quarries National Monument in Texas and Pipestone National Monument in Minnesota offer examples of extractive technology and resource use by American Indians. American Indians worked in the California gold fields, Arizona copper mines, and Alaskan mines. Spanish and Mexican mining predate American mining in the Southwest; Mexican-Americans played an important role in the early development of mining in the former Spanish provinces. Immigration of ethnic

groups from the mining regions of Europe and Latin America maybe evident at mining properties. The gold mining districts of the West attracted numerous Chinese laborers as well.

Exploration/Settlement: This area of significance applies to mining properties that represent exploration or early settlement. This includes properties associated with the prospecting, discovery, and development of a region. The gold rushes in California, the Rocky Mountains, and in Alaska a half century later are strongly associated with early settlement of their respective regions.

Invention: Mining properties may be related to the discovery of a new metallurgical process, the introduction of new machinery, or to the development of new methods of transport and power transmission. An example would be the long distance power transmission plant at Telluride, Colorado.

Labor: Mining properties may be related to mine accidents, miners strikes, unions, and other aspects of labor history. The tragedy at Ludlow, Colorado or the bloody mine wars of West Virginia are two examples of labor controversies.

Law: Mining properties may be related to the development of mineral law or to localities connected with significant litigation, which caused the reinterpretation of mineral law. For example, Nevada's history is closely associated with mining law, especially the evolving legal perspectives related to the Mining Law of 1872.

Literature: Mining properties may be related to literary figures such as Mark Twain, Jack London, Bret Harte, Rex Beach, Mary Halleck Foote, and other writers who lived in Western mining camps and used their experiences as a basis for their writing. Many of the Muckrakers or mining critics wrote about frauds in the extractive industries or published accounts of mining safety problems. One such critical examination of mining appears in Upton Sinclair's King Coal.

Military: Mining properties may be related to military intervention during miners strikes, military efforts to protect miners working in dangerous frontier conditions, and military expeditions which acted to stimulate interest in a particular area's mineral resources.

Politics/Government: Mining properties may be related to the development of mining districts or miners' meetings held to formulate laws for a district. Other properties with associations to the politics/government area may be related either to political debates over federal regulations, like the silver issue of the 1870s-1890s, or to the political aspirations of such individuals as the Western bonanza kings. These bonanza kings include California's George Hearst, Colorado's Simon Guggenheim, Montana's William A. Clark, Nevada's James C. Fair, and others who used their mining wealth for political ends.

Science: Mining properties may be related to important developments in geology, metallurgy, and other aspects of mining engineering. For example, early geologist Douglass Houghton and scientist Charles T. Jackson aided in the description and development of Midwest mineral deposits.

Social History: Mining properties may be related to corporate efforts to protect the well-being of workers through the construction of company hospitals and libraries, sponsorship of humanitarian endeavors, and other aspects of social history.

CRITERION B

Under Criterion B (association with "persons significant in our past) a mining property will possess significance if directly related to a historically significant person. Examples would include properties linked to the following aspects of a person's historical significance: Herbert Hoover's mine engineering career before he entered politics, financier Bernard Baruch's rise to power through mine speculation dealings, General Sherman's early years as a California gold dealer, or bonanza king Horace Tabor's association with the Matchless mine in Leadville, Colorado. Applicable themes under Criterion B may include exploration/settlement, invention, law, literature, politics/ government, and labor. (For additional information about Criterion B, see National Register Bulletin 32: *Guidelines for Evaluating and Documenting Properties Associated with Significant Persons.*)

CRITERION C

Under Criterion C, a mining property possesses significance if it embodies "the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction." Mining properties are often eligible for National Register listing within the following categories:

Architecture: Mining properties have an architecture of their own, especially the industrial complexes of mills, hoist houses, and smelters. Innovations in the use of metal and concrete have received broad application in the realm of mining. The multitude of gables and roof slopes has inspired other architectural developments. Noteworthy vernacular architecture is sometimes evident in mine buildings constructed by particular ethnic groups, such as the Cornish influence seen in Central City, Colorado.

Engineering: The field of mining engineering and its derivatives, such as metallurgical engineering, witnessed tremendous progress in the last century and a half. Mining properties often provide excellent illustrations of the changes in methods of mining technology over time. The work of master engineers, such as Daniel Jackling's design for the open pit at Bingham Canyon, Utah, have significance based on their design and engineering innovation.

CRITERION D

Under Criterion D, a mining property is significant if it contains information important in prehistory or history. Eligible resources which may provide such information include standing buildings or structures; surviving machinery, landforms such as mill tailings or mine waste rock dumps, or less visible physical remains such as privy pits, trash dumps, prospect pits, collapsed headframes, building foundations, roads, and machine pads or anchor piers. Application of Criterion D to mining properties requires the development of a good research design that not only identifies the research questions that are important to mining related scholarship or science but also the information that is needed to answer the research questions. The information value of what remains can be evaluated within a systematic framework based on the following: developing research questions, identifying data requirements, and assessing the property's information content.

Research Questions

The research questions used under Criterion D should be important and derived from a scholarly field, or combination of scholarly fields, such as history of technology, historical archeology, archeology, anthropology, geography, architectural history, or landscape architecture. Among others, questions about variability and change in mining technology, mining society and culture, and mining landscapes should be considered. The conditions under which innovations in mining technology take place and are accepted or rejected (e.g., Basalla 1988), for example, or the impact of changes in mining technology upon the workplace (e.g., Dix 1988, Lankton 1991) are likely to be important. Similarly, questions about community formation (e.g. Hogan 1990), the miner's domestic household, the spatial organization of mining settlements, the production and consumption of commodities in the mining frontier marketplace, ethnicity and ethnic relations, gender, and social structure are likely to be important to scholarship on mining society and culture. And yet another group of questions that may be important to the application of Criterion D have to do with the characteristics and evolution of mining landscapes (Francaviglia 1992).

Identifying Data Requirements

"Critical information" assessment is the next step in Criterion Devaluation. The type of information needed to answer each of the questions identified in the research design must be stipulated. Questions about mining technology, for example, might require information about variability and change in architectural arrangements, the spatial arrangement of work-related activities, the arrangement and type of machinery, and landforms. Similarly, the information needed to answer questions about the mining frontier marketplace may include the consumer behavior of a miner's domestic household, retail and wholesale store inventories, transportation costs, and factory production.

Field Assessment of Information Content

The last step in evaluating the significance of a mine under Criterion D is field assessment. How does one know that a property contains critical information? First of all, it is necessary to make an inventory of what remains at the property that can provide information. The remains containing information may be buried or visible on the surface and may take the form of isolated artifacts, archeological features such as trash dumps or privy pits or wells, standing buildings and structures, machinery, or landforms such as mill tailings or mine waste rock dumps. Next, assess the quantity and quality of information contained in the remains at the property. Domestic trash dumps, for example, often contain artifacts carrying information about the consumer behavior of domestic households, household organization, gender, ethnicity, and social structure.

CRITERIA CONSIDERATIONS

Ordinarily cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that meet the criteria or if they fall within the following categories:

A. a religious property deriving primary significance from architectural or artistic distinction or historical importance; or
B. a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
C. a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his or her productive life, or
D. a cemetery which derives its primary significance from graves of persons of transcendent importance, from distinctive design features, or from association with historic events; or
E. a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
F. a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance, or
G. a property achieving significance within the past 50 years if it is of exceptional importance.

Examples of historic mining properties that generally will not qualify for listing in the National Register include mining resources that are less than fifty years old, reconstructed mining towns that provide a contemporary portrayal of the frontier mining era, and collections of mining artifacts removed from their original locations and placed in museum collections. However, some of these properties may qualify for the National Register when they fall within categories A through G listed above. Examples include the following; Moved Properties-Relocated properties generally do not qualify for the National Register. Under ordinary circumstances, this requirement places few constraints on the nomination of mining resources since they are not inherently moveable. However, certain components of mining properties are, subject to relocation. For example, a shack used to store blasting powder may be small enough to have been moved from an inactive mining property to an active one. In addition, all manner of mining equipment is portable. Such equipment, classified as objects for National Register nomination purposes, would include ore carts, stamp mill batteries, drilling implements' tram cars, steam engines, water wheels, flotation tanks, and many other possibilities.

In general, if buildings, structures, or objects associated with mining activity are moved to other mining locations, these resources can be eligible as contributing features of a mining property provided that the most recent relocation occurred over fifty years ago. In addition, the moved resource must contribute to the significance of, and fall within the period of significance of, the mining property to which it was moved. If buildings, structures, and objects are more than fifty years old, but were moved less than fifty years ago, these resources will not contribute to the significance of the property. Although recently moved resources may not contribute to a property's significance, the mining property may still be eligible if it is predominately greater than fifty years old and retains integrity. Buildings, structures, and objects removed from their original locations and placed in museums for public display will not be eligible.

Resources Less than 50 Years old: A historic mining resource achieving significance within the past 50 years can be listed in the National Register if it is exceptionally important. To qualify, a mining resource must be associated with important recent themes or developments (such as World War II) that scholarly or professional research has recognized as having a significant impact on the history of mining activity.

For example, certain less-than-50 year-old uranium mines may be eligible for the National Register. Congress created the Atomic Energy Commission (AEC) following the conclusion of World War 11. Shortly afterwards, the AEC acted to stimulate uranium production by offering discovery and development bonuses. This practice fostered a uranium-mining boom that continued until the bonus program experienced severe cutbacks in 1958. If sufficient scholarly documentation has been produced to demonstrate that particular uranium mines played exceptionally important roles in the development of the nation's nuclear capabilities, these mines may be eligible for listing in the National Register even though they are less than 50 years old. Establishing exceptional importance will require that such mines be compared with other uranium

mines having similar associations and qualities in order to identify the strongest candidates for National Register listing.

INTEGRITY

Integrity is the ability of a property to convey its significance. To be listed in the National Register, a property must not only be shown to be significant under the criteria, but it also must have integrity. The National Register recognizes seven aspects or qualities that, in various combinations, define integrity. The seven aspects of integrity consist of the following: location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity, a property will always possess several, and usually most, of the aspects.

When assessing the integrity of a mining property, it is important to remember that the National Register will accept significant and distinguishable entities whose components may lack individual distinction. As discussed elsewhere in this bulletin, the passage of time, exposure to a harsh environment, abandonment, vandalism, and neglect often combine to cause the deterioration of individual mining property components. For example, buildings may have collapsed, machinery may have been removed, and railroad tracks may have been salvaged. However, the property may still exhibit a labyrinth of paths, roads, shaft openings, trash heaps, and fragments of industrial activity like standing headframes and large tailing piles. Although these individual components may appear to lack distinction, the combined impact of these separate components may enable the property to convey the collective image of a historically significant mining operation. In essence, the whole of this property will be greater than the sum of its parts. In such cases, a mining property may be judged to have integrity as a system even though individual components of the system have deteriorated over time.

Because most historic mining properties will be abandoned and in poor repair, special care must be taken when evaluating integrity. The integrity of a mining property can not be judged in the same fashion as the integrity of a building. In some cases, buildings and objects related to mining will have been relocated and many original construction materials will be gone. The following sections explain how the seven aspects of integrity relate to historic mining properties.

LOCATION

Integrity of location means that a mill or mine remains in its original location. A place where mining once occurred is not inherently moveable, but components used to conduct mining or milling can be moved. Because machinery was often moved to several different mining properties during its lifespan, relocated historic mining equipment (i.e., equipment over fifty years old) can retain integrity under certain conditions. For example, 100-year-old mining equipment may have been moved to a newer mine that first went into operation seventy years ago. Although this equipment

is not in its original location, it can contribute to the significance of the property since it has been in place for over fifty years.

In other cases, a mine may be historic (i.e., over fifty years old) and equipment at the mining location may be historic (i.e., over fifty years old), but the equipment may have been moved to the location less than fifty years ago. Historic equipment which has been at a mining property for less than fifty years will not contribute to a property's significance. However, this equipment will not necessarily detract from the property's integrity provided that the equipment generally serves to complement the setting.

Machinery moved explicitly for the purposes of display in a museum, park, or other interpretive site completely divorced from the place of historic mining activity has lost integrity of location. Machinery moved to "artifact gardens" also lacks integrity.

DESIGN

As mentioned earlier, mines and mills evolve through time with the introduction of new machinery or technology or the expansion of the mining operation. This evolution means that plants found in an unaltered state are rare. Thus, contemporary evaluation of a mill's integrity should not only be based on its conformance with an original construction plan, but also on its ability to illustrate the property's evolution through time. However, in cases where the property has undergone significant alterations during the past fifty years, the evolutionary process may result in a loss of integrity.

Mining operations were designed to follow established mine engineering practices that involved the flow of ore from the mine to the mill to the refinery. The engineering flow chart is essential in understanding the integrity of design. The lack of a minor feature in a system should not detract from its integrity, much in the same way that a missing cornice detail should not result in a loss of integrity for an entire house. However, the cumulative number of missing components must be taken into consideration.

When considering the cumulative loss of features, the evaluator must be sure to include buildings and machinery as well as the designed landscape the moved earth, and piled stones or debris. For example, when evaluating a placer mine which has a historic hydraulic nozzle found in place but lacking any of the connecting system or evidence of canvas or metal pipes, take into consideration any earth works used to support the system. The pipe may be piled nearby to avoid being split by winter freeze or washed out by early spring flood. In this case, the hydraulic system may still have integrity of design because the machinery and earth works were found as they were meant to be in mid-winter.

Underground works were designed as part of the mine system and, under some conditions, may receive consideration when establishing integrity of design. However, the underground works may be inaccessible and need not be inspected for National Register integrity if the mine is unsafe. The majority of underground mines is

extremely unstable and should never be entered unless a State mining inspection has certified their safety. Thus, design integrity will generally be limited to the ability to reconstruct the flow chart from the mine opening and beyond.

SETTING

Historic mines were industrial complexes that contained a multitude of functions. In many cases, the industrial features typical of a mining property are not pleasing to the eyes of contemporary viewers. For example, use of dredges may have left unsightly tailings piles that stretch for miles along streambeds. In other cases, a historic mining area may be littered with abandoned machinery and dilapidated buildings and structures. The appearance created by these vestiges of bygone industrial activity represents important aspects of setting that can actually contribute to the integrity of a mining property.

Modem day intrusions can compromise the setting. Attempts to artificially embellish a mining property's setting can detract from the property's integrity. For example, the introduction of false-fronted boomtown structures can create an inappropriate setting that lacks historic authenticity. Other modem intrusions include recent mining activity that can compromise integrity of setting through the introduction of newer mass mining systems that destroy the historic mining property or leave it isolated. Also, recent settlement or development associated with gambling or other development initiatives in a historic mining location can have a negative impact on integrity of setting.

MATERIALS

Retaining integrity of materials requires evidence that sympathetic materials have been used during the course of previous repair or restoration of mining properties. Thus, a mine tramway with wooden supports should have been repaired with in-kind wooden materials. Because mine structures were often unpainted and expected to deteriorate, previous restoration efforts should have used untreated wood with the expectation that it would eventually need to be replaced too. However, inappropriate painting of mining properties will not automatically amount to a loss of integrity.

WORKMANSHIP

To the largest extent possible, mining properties should retain-evidence of original workmanship. For example, the integrity of workmanship should be maintained in cases where an underground mine is open to the public. This would include preservation of such features as square-set timbering systems, the protection of pipelines and track, and retaining the feel of the confined working space.

FEELING

As abandoned industrial properties generally located in isolated areas, the sites of historic mining activity often evoke a strong sense of feeling when viewed by contemporary observers. Since mineral resources are nonrenewable, mines close when ore reserves are depleted. Structures and equipment are simply abandoned. The image of abandonment has attracted more popular attention than active industrial operations. The feeling of a deserted historic mine can help reflect the character of the boom and bust cycles of mining regions. The loss of this feeling of isolation and abandonment due to encroaching modern development can diminish the integrity of a mining property.

ASSOCIATION

Integrity of association will exist in cases where mine structures, machinery, and other visible features remain to convey a strong sense of connectedness between mining properties and a contemporary observer's ability to discern the historical activity which occurred at the location.

Three brief examples may help to summarize the process of applying integrity standards to mining properties. The first example involves those rare cases where a mining property consists of a complete mining system including shaft, transportation facilities, extant mill buildings, worker housing and other aspects of the overall system. In such cases, the property would have integrity

In the second, more typical, example, a mining property would lack visible buildings or contain only buildings that had been altered extensively. However, the property would have associated features like mineshafts, headframes, tramways, house and mill foundations, tailing piles, trash dumps, cemeteries, privies, and other isolated objects. Although buildings may be lacking or in a deteriorated state, this property would have integrity as long as key aspects of the mining system remain visible.

In a third case, visible buildings might remain extant, but the buildings may have been totally altered and the fundamental components of the mining system may have been destroyed by modem development. This property would have lost integrity.

The important principle inherent in each of these three examples is that the integrity of mining properties will frequently hinge not so much on the condition of the extent buildings, but rather on the degree to which the overall mining system remains intact and visible. This method of evaluating integrity requires a holistic outlook that comprehensively considers all the component parts of a mining system. If clear physical evidence of a complete system remains intact, deterioration of individual aspects of the system may not eliminate the overall integrity of the resource.

V. DOCUMENTATION AND REGISTRATION

National Register Bulletins 16A and 16B contain specific instructions for completing individual and multiple property nominations. The following discussion will focus on special considerations related to the nomination of mining properties. This discussion begins with a brief overview of the different nomination formats and the circumstances under which one format may be employed instead of another.

The National Register lists individual properties, including districts, sites, buildings, structures, and objects. Multiple property submissions contain groups of properties, which are related by common historical associations or physical characteristics and which are nominated under a single "cover document."

The National Register Registration Form (NPS Form 10-900) should be used for the nomination of individual districts, sites, buildings, structures, and objects related to mining. This format is used in situations involving the nomination of an individual standing structure or building such as a single powder shack, mill, or headframe. However, individual mining resources generally do not exist in isolation. Based on the premise that individual mining resources will usually serve as single elements of larger mining systems, only a relatively small percentage of mining resources will be nominated as individual buildings or structures.

Given the prevalence of mining systems, the historic district is a common framework for nominating a concentrated assemblage of related mining resources to the National Register. The National Register defines a district as follows: "A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development." This definition aptly describes many mining properties. Most potentially eligible mining properties do not consist only of a single resource, but rather will include a discrete historical area containing a grouping of functionally related resources that all played a part in the extraction, refinement, and production of minerals. Historic districts are nominated on the National Register Registration Form.

A discontiguous district may be relevant to the nomination of mining properties. A discontiguous district is composed of two or more definable significant areas separated by nonsignificant areas. According to *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation* A discontiguous district is most appropriate where

1. elements are spatially discrete;
2. space between the elements is not related to the significance of the district; and
3. visual continuity is not a factor in the significance.

These three factors could apply to many mining properties. Given the large-scale nature of certain mining activities, elements of many mining systems will be separated

by spaces unrelated to the significance of the district. Among many possibilities, discontiguous districts may be most appropriate for the nomination of mining properties involving linear systems like tramways, ditches, and flumes. Ditch and flume systems, for example, may have periodically terminated by dumping water into streams. Water may then be diverted back into the same system several miles downstream. In this case, the stream itself may not be included in the district, but the ditches and flumes would be elements of a discontiguous system. In another example, an aerial tramway originally built to transport cooper ore to a smelter several miles away might be nominated as a discontiguous district containing both the tramway and the smelter. Although first built as a linear system, many elements of the system may have lost integrity today. All the tram towers may have been removed and the entire tram route may be covered with forest growth not present during the period of historic significance. However, the copper mine, the smelter, and several tram tower pads may remain clearly visible today. These elements of the original tram system could be nominated as a discontiguous district. A discontiguous district is nominated on a National Register Registration Form.

The Multiple Property Documentation Form (NPS Form 10-900-b) is used to document a group of significant properties linked by a common historic context. The Multiple Property Documentation Form is not used to nominate properties, but provides a historical overview, defines property types related to the overview, and outlines the significance and registration requirements for the property types. Individual properties associated with the historic context are nominated on a National Register Registration Form. An example might involve several gold mines dispersed across a given county, all of, which produced ore for refinement at a mill located some distance away from each of the mines. The historic significance of the mines and the mill could be outlined in a historic context titled "Gold Production in Grand County, 1874-1893." In terms of property types, all the mines can be classified as an extraction property type and the mill could be categorized as a beneficiation property type. The registration requirements for property types establish a benchmark for defining eligibility for listing.

The historic context documentation pertaining to "Gold Production in Grand County" and related property type information is included on the Multiple Property Documentation Form. Within the multiple property framework separate nominations for each of the individual mines, the mill, and any historic districts must be prepared using registration forms (NPS Form 10-900). The advantage of this approach is that one "cover document" can be used to expedite the documentation and nomination of a number of separate properties

Because mining properties are often large and complex resource types, several historic contexts may be required to convey the overall significance of a mining property. However, nominations can be submitted before all associated historic contexts have been documented. Once a single historic context has been documented on a Multiple Property Documentation Form, related property nominations can be prepared and are

submitted to the National Register. When other historic contexts are documented and property nominations completed these can be submitted to the National Register at a later date as amendments to the original Multiple Property Documentation Form. Thus, the multiple property format offers a flexible mechanism for nominating groups of mining properties over a period of time.

Situations will arise where individuals involved in the preparation of nominations will ask whether a historic district nomination is most appropriate for a given mining property or whether a multiple property nomination ought to be undertaken. A multiple property submission will usually be appropriate in cases where separate mining resources are related by a common historic context or theme, but are spatially separate. An example would involve several mine properties associated with a mill where all the ore within a mining region was brought for refinement In spite of the obvious historic association between the mines and the mill, it may be that the transportation systems leading from the mines to the mill have lost their historic identity over the years. Another possible scenario would involve a case where the same hypothetical mill is located so far away from the mining property that creating a historic district is not justified. In these situations, nominators should adopt the multiple property format.

A district nomination generally will be appropriate in cases where all of the elements of an intact mining system are located within a contiguous geographic area. The size of such an area might vary from a small parcel of less than one acre, which includes a few buildings and a mine shaft opening to a broad expanse extending over a thousand acres and including mines, mills, tramways, flumes, roads and other related pieces of machinery and equipment. In addition, all the elements of the district must retain their historic associations with one another.

Whether preparing individual property nominations or multiple property nominations, the National Register Registration Form plays a role. Several sections of the registration form are of particular importance when nominating mining properties. These sections include #7 (description), #8 (significance), and #10 (boundaries). Each of these elements of the individual form will now be examined in greater detail.

SECTION 7: DESCRIPTION

The description section of an individual registration form should begin with an introductory paragraph that briefly describes the property, notes its major physical characteristics, and assesses its physical integrity. Additional paragraphs should support the introductory paragraph and provide a more detailed description of the property. This additional material should also discuss the property's historic and current condition, and identify and date of any alterations, additions, or other changes that have affected the historic evolution and integrity of the property. Other specific issues that should be addressed in describing mining properties will include discussion of the following

*Natural features that contributed to the original decision to conduct mining activity in the area.
*Any landscape modifications associated with historic mining activity (i.e., tailings piles, gob piles, etc.).
*Deterioration due to vandalism, neglect, lack of use, or severe weather, and the effect it has had on the property's historic integrity.
*Original and other historic machinery still in place.
*Linear systems within the property such as canals, ditches, railroads, railroad beds, roads, and tramways including their approximate length and width and the location of terminal points.

If the mining property is nominated as a historic district, the description section also should discuss whether or not all the individual components of the resource contribute to the significance of the historic district. In determining whether district resources are contributing or noncontributing, consider specific information about each resource including its period of significance, function, association, information potential, and physical characteristics. All resources should be keyed as contributing or noncontributing on a sketch map submitted with the form.

SECTION 8: SIGNIFICANCE

The statement of significance should begin with a paragraph summarizing the significance of the mining property. This paragraph should explicitly discuss how the property meets the National Register criteria, including the criteria considerations, and how it represents all periods and areas of significance indicated on the form. The opening paragraph should be followed by a discussion of the property's historic context. Additional facts directly pertaining to the property's eligibility may be included to establish a property's significance, integrity, or ability to meet one or more criteria considerations.

Questions tend to arise about the required length of the historic context documentation. In general, the National Register does not mandate that a particular amount of documentation should accompany each nomination. Sufficient information should be provided to justify the significance and eligibility of the nominated properties. However, the length of the context statement will vary depending upon the nomination format. The multiple property format requires that historic context material be included in the multiple property documentation form This means that individual nominations submitted as part of a multiple property package need only include a description, a brief historic context statement pertinent to that property, and an indication of how the nominated resource meets the registration requirements established for measuring the significance of the property type. However, properties nominated without a multiple property cover form will have to contain sufficient context information within the nomination to support registration. When explaining

the significance of, mining properties, the following types of questions should be addressed:

*How do the extant vestiges of mining functions or processes relate to the broader mining or technological development of the locality, region, State, or nation?
*How important were the entrepreneurs, engineers, laborers, ethnic groups, and others who contributed to the development of the mining operation?
*How do the remaining buildings, structures, sites, objects, and historic districts reflect significant mining production processes?
*How did the mining operation(s) impact or influence other activities within a region or locale, such as exploration, settlement, and/or other commercial development-related activities?
*How is evidence of historic mining activity reflected in the archeological record?

SECTION 10: BOUNDARIES

All mining property boundaries should be plotted on USGS topographic maps. These maps will be included with the nomination documentation. Because of the complexity of many mining properties, a separate sketch map (preferably drawn to a scale of 1 inch equals 200 feet) may help to dearly identify both the boundaries and the resources within those boundaries. Resources within sketch map boundaries should be labeled as contributing or non-contributing. These resources should also be cross-referenced to the description section (Section 7) of the nomination.

Mining property boundaries should be selected to encompass, but not exceed, the full extent of the resources making up the property. Boundaries for a single parcel of land should encompass the significant concentration of buildings, sites, structures, or objects, which comprise the mining property. Byproducts of mining activity, such as tailing piles, should be included within property boundaries.

In nominations involving discontiguous historic districts, a separate boundary should encompass each discontiguous element of the district. Each discontiguous element should be plotted on a USGS map, even though several maps may sometimes have to accompany the nomination. If necessary, separate sketch maps may be submitted for each discontiguous element.

In some instances, legally recorded mineral patent applications will help to determine the appropriate boundaries for a mining property. Such material can help to develop verbal boundary descriptions and to accurately plot the location of mining properties on the USGS maps that must accompany each National Register nomination. If available, these patent applications may be found in county courthouses, state geological offices, or in Bureau of Land Management offices.

The aboveground portion of a mining property will often be considerably smaller than portions of the property located beneath the surface of the earth. Because of the

potential dangers involved, field investigators should not attempt to verify this fact by exploring underground mines. Underground investigation should only be attempted in those very rare cases when a State mining inspector has certified that a mine is safe to enter. As a general rule, however, exploration of underground mines should be avoided.

In some cases, written records may contain information about the extent of an underground mine. If so, this knowledge should be utilized when determining the aboveground boundaries of the property. Such information should be used to define aboveground boundaries that encompass the extent of the underground reaches of the mine. This will help to protect the full extent of the mining property by assuring that development projects only occur outside the property boundaries. In addition, such measures will help to ensure that new development does not take place in areas where ground subsidence is likely to occur. In many cases, however, boundaries will relate only to the mining resources visible on the surface of the ground.

VI. SELECTED BIBLIOGRAPHY

SAMPLE PERIODICALS AND JOURNALS

The following are examples of periodicals, and journals that were in print during the nineteenth and early twentieth centuries that discuss events, technology, and personalities involved with mining during that era. This list is by no means exhaustive, but will provide general guidance to researchers. The periodical and journal titles are commonly used but may have changed over time.

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VII. GLOSSARY

This glossary provides a quick overview of terms used in the text. For a comprehensive glossary of mining terms see Albert H. Fay, A *Glossary of the Mining and Mineral Industry, US.* Bureau of Mines Bulletin 95, Washington, D.C.: Government Printing Office, 1920 edition and Paul W. Thrush, comp., A *Dictionary of Mining, Minerals and Related Terms, US* Bureau of Mines, Special Publication, Washington, D.C.: Government Printing Office, 1968.

Adit: A horizontal passage driven from the surface for working or unwatering a mine.

Amalgamation: The process of bringing particles of free gold or silver in contact with mercury. The most common practice was to pass a slurry of crushed gold ore over large copper plates that had been coated with mercury or, in the case of silver, mix a slurry of crushed silver ore in metal pans containing mercury.

Arrastra: A primitive mill using a circular path of cobblestones with retaining walls on either side. Heavy drag stones were drug over the mixture of ore and mercury using a horse, water wheel, or steam for power. As the ore was crushed the free gold was amalgamated. The amalgam was dug from between the cobblestones.

Assay: The content, type, or quality of metal in an ore was tested or "assayed" by an experienced assayer using various methods including fire assay or acid tests. Assay offices often purified precious metals prior to shipment to the mint.

Base Metal: Copper, lead, zinc, and other common industrial metals.

Beneficiation: The initial process of upgrading ore.

Blast Furnace: An upright shaft furnace in which solid fuel was burned with an air blast to melt the ore and fluxes, and obtain a separation between the metal and the slag.

Bucket: In mining an enlarged metal or wooden bucket used to haul matter out of a mine shaft. Sometimes used to carry miners.

Breaker: A machine used to break coal, particularly anthracite, prior to shipment. In time, the entire surface crushing and separating plant at an anthracite coal mine was called a breaker.

Cage: A vehicle riding on guides in the shaft, that was moved up and down by the hoisting engine, and was used for hauling men, supplies, and ore.

Coke: The product obtained from fixed carbon and incombustible material after strongly heating bituminous coal out of contact with air, and driving off the volatile constituents.

Concentrator/Concentration: A device or process for reducing the values in an ore into a smaller bulk in order to diminish the expense of shipping and further treatment. Sluicing of placer ground was the earliest form. Hand sorting of ore to obtain a higher grade was probably the most commonly used. In concentrating mills the ore was crushed, screened to the proper size, and then passed over vibrating tables to separate the heavier metals from the gangue. Concentrator was the name given to -the surface plants, which concentrated ore into a concentrate prior to shipment to smelters.

Cornish Steam Pump: A very early mine pump that was invented by Watt for the Cornish tin mines in England. The pump consisted of a steam engine that operated a walking beam. The other end of the beam was connected to a wooden timber that extended to the bottom of the shaft. The end of the timber was connected to a piston with check valves so the water was lifted on top of the piston. If the shaft was greater than 300 feet deep, an additional pump had to be installed, and the water in the lower section was pumped up into a sump. The top section then pumped the water from the sump to the surface. Additional walking beams were installed to act as counterweights to overcome the weight of the timber and the water column.

Cyanide Process/Cyanidation: The dissolving of gold and silver by the use of a solution of alkaline cyanide. The process was invented in Scotland in 1887, first successfully used in South Africa and New Zealand in 1890, and in the United States at Mercur, Utah in 1892. The practice consisted of fine grinding of the entire tonnage in a roller, tube, rod, or ball mill. The crushed ore passed to leaching tanks. A solution of sodium or potassium cyanide was placed in the tank with the ore. The ore then gave up the silver or gold mineral into the solution. The gold was retrieved in zinc boxes (or other methods of precipitation) where the precious metals were precipitated. The precipitate was smelted and refined into gold and silver bullion.

Dredge: A floating placer mine operation where buckets scooped up gravels that were then screened, sorted, and sluiced. Gold stayed onboard in the sluice boxes while waste gravels and sand were washed back into the creek or sent by conveyer to stacks in the creekbed behind. The dredge was developed in New Zealand in the 1880s and first successfully worked in the United States at the Bannack District, Montana in 1895.

Flotation: The separation of minerals from each other and from waste matter by inducing (through the use of reagents) relative differences in their abilities to float in a liquid medium The process win separate all metallic sulphides or elemental metals. if necessary, differential flotation can be used on complex ores. In such an ore, each sulphide mineral, such as copper, lead, and zinc, can be separated from the others. First patented by Carrie Jane Everson of Denver on August 4,1886, the process was ignored until perfected in Australia at the turn of the century. The first successful plants in the United States were at Butte where in 1911 the process was introduced at

the Butte & Superior zinc-lead mine and at the Inspiration Copper Mine at Ore bin: A metal or wooden structure Miami, Arizona in 1915.

Flume: An inclined channel, usually made of wood, for conveying water.

Grubstake: An agreement between the miner and a business owner whereby food, clothing, ammunition, and mining supplies would be furnished in exchange for a negotiated percent of return on the miner's earnings.

Headframe: A timber or steel structure over the shaft that supports the sheave and hoisting rope and is braced to withstand the pull of the hoisting engine.

Hoist: Any engine with a drum on which the hoisting rope is wound.

Hydraulic mining: The excavating of a bank of gold-bearing gravel by a jet of water that was discharged through a nozzle under great pressure. The nozzle was known as a "monitor" or a "giant." The gravel was carried away by the water and transported through sluices with riffles to catch the gold. Hydraulic mining was perfected in California by 1853.

Long Tom: An open box 12 feet long that is 15 inches wide at the upper end and 30 inches wide at the lower, or discharge, end. The lower end is closed, but has a screen in the bottom of the last two feet. The holes in the screen are one-half inch wide. Under the screen is another inclined box at least 36 inches wide and 6 feet long with riffles in the bottom. Both boxes are usually 12 inches deep. Water enters at the upper end and washes the gravel through the screen. The slurry drops into the lower box and the heavy metal is collected in the riffles.

Matte: The metallic mixture that results from smelting sulphide ores.

Mill tailing: See tailing.

Mine Face: The end of a tunnel, drift or exposed ore body.

Open cut; open pit: A method of mining the ore in which the workings are open to the surface.

Ore: The portion of a deposit containing valuable minerals that can be mined at a profit.

Ore bin: A metal or wooden structure used to store ore prior to shipment.

Placer mining: The extraction of heavy minerals from alluvial gravel by removing the detrital material with running water and trapping the values in riffles.

Precious metals: Usually designated as gold, silver, and platinum.

Prospect: A mineral property, the value of which has not been proven.

Raise: A vertical or inclined opening or passageway connecting one mine working area with another at a higher level.

Russell Process: A metallurgical process perfected in the mid-1880s at Park City, Utah for the extraction of silver via lixiviation.

Shaft: A vertical or steeply inclined access passage from the surface into a mine. It is usually sunk from the surface by mining in a downward direction. The interior is timbered so that each entity has its own passage way or compartment-cage, skip, manway, or pipe.

Sluice: A series of inclined troughs, each of which are about 12 feet long and 12 inches square, called sluice boxes. These were coupled together to form a continuous trough 24 to 72 feet long. Devices known as riffles were placed in the bottom of the sluice. As the gravel was washed through the trough, the heavier metals were retained by the riffles.

Smelting: The chemical reduction of a metal from its ore and certain fluxes by melting at high temperatures. The non-metallic material floated on top of the heavier metallic constituents in the molten state and remained in that position when it cooled and hardened.

Stamp Mill: The ore to be treated by amalgamation is usually ground in a stamp mill. A stamp consists of a vertical steel stem with an iron foot or shoe that is lifted by a cam and dropped onto previously crushed ore. Five stamps in a row are usually included in one battery.

In the case of gold ore, the discharge from the battery flows over amalgamating plates. These are copper plates usually about the width of the battery (approximately 5 feet) and 10 to 12 feet long. The copper sheets have a silver plating and are coated with a thin film of mercury which adheres to the silver. This allows them to catch the particles of gold. Silver ore passes from stamps to pans for amalgamation.

Stamp milling was developed in Europe during the Middle Ages and improved in California in the 1850s. The process was used throughout the precious metal mining regions of the United States until amalgamation was replaced by the cyanide process in the early twentieth century.

Stope: An opening in the underground workings of a mine from which ore is mined. The width and height of the stope are determined by the size of the ore body.

Strip Mine: See open cut; open pit.

Tailing: The gangue and other refuse material resulting from washing, surface by mining in a downward concentrating, or treating ground ore that is discharged from a mill.

Timbering: The operation of setting timber supports in a mine.

Tipple: The tracks, trestles, and screens at a coal mine where the coal is processed and loaded.

Tramway: An established system of roads, rails, or cables over which ore is moved from the mine to the mill.

Waste Rock Dump: The uneconomical rock that was mined and disposed of in the vicinity of a mining operation.